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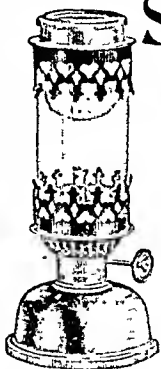
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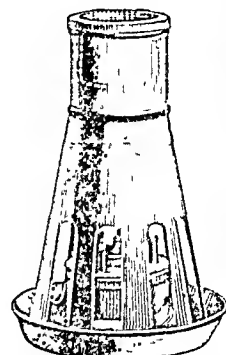
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ERRATA. Dr. C. W. Burr's article in JOURNAL for March, 1901.

Page 315, line 22, for "stereognosis," read "stereognosis."
 " 315, " 24, " "stereognosis," " "stereognosis."
 " 315, " 27, " "stereognosis," " "stereognosis."
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THE
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OF THE MEDICAL SCIENCES.

APRIL, 1901.

PRIMARY SPLENOMEGALY.

WITH A REPORT OF THREE CASES OCCURRING IN ONE FAMILY.¹

By N. E. BRILL, A.M., M.D.,
OF NEW YORK.

THE cases which are about to be reported here are, in addition to their extreme rarity, noteworthy because their subjects have been under my observation for over fifteen years. I have refrained from publishing them earlier, since no scientific results could be obtained from a mere description of their clinical histories. I had long considered them unique and knew of no other cases in the literature just like them. They are now recorded so as to supplement the valuable contribution to *splenomegalia primitiva* made by David Bovaird, Jr., in a recent number of THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES (October, 1900), in which he describes two similar cases.

These cases reveal a family form of primary splenomegaly all developed in one generation. On this account the *family history* of these patients is important.

The mother of my patients is in her sixty-second year, in perfect health. The father died last year, under my care, of pneumonia. Of the maternal parents (the grandparents of the patients), the father died at seventy-two years, likewise of pneumonia, under my observation; the mother at thirty-eight years, in childbirth. Of the paternal parents, the father is said to have died of gallstones at seventy-three years; the mother died last year, at ninety-four years, of shock due to a fall down stairs, while under my care. In none of them who were under my observation was there any enlargement of the spleen or liver.

As far as inquiry as to the great-grandparents of our patients goes, an accurate report can be furnished only as to those on the maternal

¹ Two of the patients were presented at the meeting of the Society of Alumni of Bellevue Hospital, November 7, 1900.

side. The great-grandfather died of an apoplexy at eighty-five years, the great-grandmother of an acute disease of one week's duration. On the paternal side the great-grandparents died, it is said, of old age.

The mother of my patients gave birth to six children. Of these the eldest is in perfect health and is the mother of two healthy children. The second child died at the age of three years, of chronic diarrhoea and marasmus. The third is one of the cases here reported. The fourth is in good health. The fifth is the second of the cases here described. The sixth died at the age of nine years, of an enlargement of the spleen, and furnishes the third case of this disease.

I had not the fortune to see the last child, whose death occurred before my introduction professionally into the family. Trustworthy accounts tell of the life of this boy, which was one of suffering after the third year from birth. The child was slow and lacked energy, but was not at all mentally backward. The mother noticed its inability to run and play like other children of its age. She likewise noticed an increasing fulness of its abdomen, with a commensurate increasing languor and indisposition to make any effort. According to her statement, the nature of the disease was unknown to the physician first consulted. Toward the end of his short life all the physicians agreed that there was an enormous enlargement of the spleen. The abdomen enlarged greatly; the child became weaker, its skin became yellow and shrivelled, and finally the child could no longer walk, and died of asthenia.¹

Dora W., the third child, is thirty-four years old, married; has had no children and no miscarriages. She has been under my observation since 1885. I am told she had none of the ordinary diseases of childhood. She had always been healthy, energetic, and almost tireless in her social duties. She was married in 1888. She never had malaria, rheumatism, tuberculosis, or rachitis.

Before her marriage I had no occasion to make a physical examination of her. She did not note anything unusual about her condition until about this time, but was convinced shortly after her marriage that there was an enlargement of the abdomen under the ribs on the left side, where there was a firm mass, which occasioned no discomfort whatever.

On examination I found a spleen which extended from the lower border of the eighth rib above to three finger-breadths below the costal margin and almost to the parasternal line. The liver was not enlarged. There were no enlarged lymphatic glands. All the thoracic organs were normal.

A relative estimation of the proportion of white to red cells of the blood was made according to the methods then in vogue, when but few blood-counts were made in America, and revealed what I believed to be more white cells in the field than was normal. The diagnosis of leukaemia was made and subsequently corroborated by a prominent consultant. Both of us gave a bad prognosis.

After treating the patient for about two years, and there being no reduction in the size of the enlarged organ, the patient sought other advice and treatment. While under my care she was treated with

¹ Since writing this I have had a communication from the physician under whose care the child had died, Dr. L. S. D., who corroborates these data and says that no examination of the blood had ever been made in these

iron, quinine, and arsenic. I did not see the patient again professionally until 1895, when she gave me an opportunity to examine her again. During this period the spleen had increased considerably; its anterior border extended further forward toward the mesial line. A notch was distinctly felt midway between the umbilicus and the lower border of the ribs. The limit of growth forward was in the mesial line midway between the umbilicus and the pubes.

She informed me that while under the care of a colleague she had been treated with continued large doses of quinine and arsenic, also with methylene-blue, with injections into the spleen of pyoktanin, ergotin, and arsenic, with cataphoresis with these drugs, with electrolytic puncture of the spleen, and with galvanism over the organ.

Between these years she had two attacks of pleurisy, with effusion of a clear, yellow serum. She also developed a tendency to sweating, with sudamina, which culminated in the summer of 1895 in a most severe attack, which persists on varying occasions to this day. In 1896 the sudamina assumed a tendency to be hemorrhagic and finally changed to what the patient called a "crop of blood-boils." Up to this time there had been no indications of any hemorrhagic tendencies. She had normal menstrual periods of normal amounts.

The first systematic blood examination was made by me in 1895, with the following result: Red cells, 4,800,000; white cells, 7168; hæmoglobin, 80 per cent. (Gowers' instrument).¹

In 1896 I treated the patient for an attack of typhoid fever, which went through an ordinary course without complications; the attack lasted six weeks. It is worthy of note that during her typhoid the spleen, which had been previously hard and tense, was much softened, but no larger than it had been one month before (July, 1896) when I had examined it. After this, however, marked changes in the physical condition occurred, and a detailed description is important to show the steady progress in the disease and the development of new symptoms.

Status of the Patient Two Months after the Typhoid Convalescence (December 14, 1896). The patient is a small woman of small osseous development. The skin has now a peculiar yellowish hue (not like icterus), with a tendency to shrivel like the skin of an old woman. It is marked by dark pigmented spots sparsely scattered over the trunk and extremities, most numerous on the anterior surface of the right leg. These are the residua of a crop of hemorrhagic furuncles. There are no glandular enlargements to be felt anywhere. The tonsils are rudimentary. The gums are a little spongy and inclined to bleed. There is no marked pallor to the visible mucous membranes. Over the sclerotic of each eye is a wedge-shaped patch, yellow in color (the rest of the sclera is white), which extends from the corneal margin, where its base is 3 mm. broad, toward the canthus of each eye for a distance of 0.5 cm. These do not look like pingueculæ.

The shape of the trunk is peculiar, the lower part of the thorax and upper part of the abdomen being enlarged in all directions, the greatest

¹ It is my opinion that Gowers' hæmoglobinometer is over-standardized, and that the hæmoglobin of these patients' blood is higher than the figures given. The writer has found that the hæmoglobin percentage of blood in healthy people with high color often falls below the 100 mark of this instrument.

circumference being at the level of the umbilicus. This region is distinctly round, the antero-posterior diameter being fully as large as the lateral.

Respirations, 28; *pulse*, 80.

Lungs. At both bases there are diminished breathing and diminished voice-sounds, due to pressure upward of the spleen and liver.

Heart. Apex-beat at the lower border of the fourth rib, one inch to right of nipple. Upper border of cardiac dullness at the upper border of the third rib, right border at midsternal line. There are no cardiac murmurs.

Liver. Somewhat enlarged. The upper border is just below the fourth rib; lower border 5 cm. below the free costal margin, in the mammillary line. The entire region is tender to pressure.

Spleen. The anterior border is round, sharply demarcated, and presents a large indentation, the notch 2 cm. to the left of the middle line and 2 cm. above the umbilicus. It extends downward over the bladder to 4 cm. above the right pubic spine, where it curves, to be continued with the posterior border, which emerges into the abdomen at about the crest of the ilium. The spleen is very tense and firm; its surface has no irregularities or nodules and is uniformly smooth. The upper border of splenic dullness is over the seventh rib, in the axillary line.

The veins of the skin of the abdomen are not very prominent. The lower abdomen protrudes.

The uterus is crowded downward and backward.

The urine is acid, 1012 specific gravity, and contains no albumin, no casts, no bile, and no sugar.

The blood-count shows red cells, 3,800,000; white cells, 6400; hæmoglobin, 65 per cent. (Gowers).

This examination of the blood shows a reduction in the number of red cells as well as the hæmoglobin from the previous one. The slight simple anemia manifests itself in the pallor of the skin.

A qualitative count of the white blood-cells showed multinuclears, 65 per cent.; large mononuclears, 5 per cent.; small mononuclears, 30 per cent. There were extremely few eosinophile cells.

There was no poikilocytosis nor were there any nucleated red cells.

A thorough course of mercurial injections and internal administration of sodium iodide was instituted, but with no effect on the splenic enlargement.

After this the spleen grew gradually and quickly in size in all directions, and the liver but slightly. The detailed descriptions of the conditions found in my various examinations during the next three years are unnecessary and would be tiresome to the reader. It is important to state, however, that the blood showed at no time any marked qualitative change from the normal limits of red and white, there being a slight tendency to leukopenia, the highest number of white cells being 6144, the lowest 4200. The hæmoglobin remained about 75 per cent., the variations being from 65 to 80 per cent. (Gowers). At no time was there any qualitative change present in the red or white cells indicative of any serious form of anemia.

During these years the patient suffered occasionally with dyspnoea, pain in the right ankle and leg. There was no tenderness over any of the bones at any time. She also was troubled with numbness in the

finger-tips, though examination revealed no objective disturbances of sensation to pain, touch, or temperature.

The notes of my last examination bear the date of October 4, 1900. The abdomen is more protuberant; the upper border of the splenic dulness is on the fifth rib. The posterior border of the spleen can be distinctly felt on palpation. It extends along the vertebral column from the last rib above to the crest of the ilium below. In front it extends into the pelvis, and its anterior border in the lower third extends across the abdomen, there being but 0.5 cm. between it and the right superior spinous process of the ilium. The lowest part of the spleen fills the pelvic cavity.

FIG. 1.

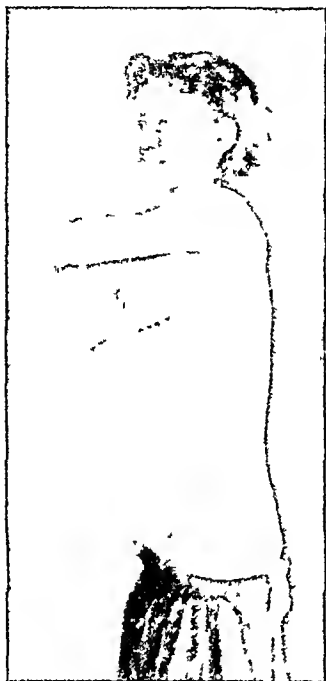
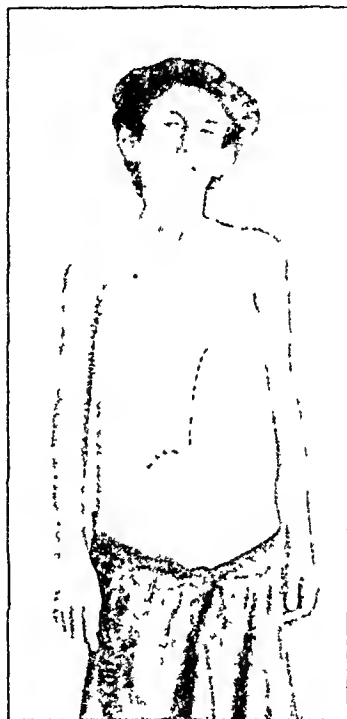


FIG. 2.



The cross to the right of the nipple shows the position of the apex of the heart; the dotted lines indicate the upper and anterior limits of the spleen.

The liver is crowded somewhat upward, the upper border of dulness being in the third interspace, the lower border 6 cm. below the costal margin, in the mammillary line.

The circumference of the abdomen has increased markedly. There is tenderness over both spleen and liver. The general features are much better shown in the accompanying photographs than by any description. (See Figs. 1 and 2.)

The color of the skin of the patient is a peculiar brownish-yellow, nothing like an icteric skin, however; her mucous membranes are pale, yet her blood shows 4,200,000 red cells, 7168 white cells, and the hæmoglobin is 70 per cent. The differential count of the leucocytes

is: Polynuclear, 56 per cent.; large mononuclear, 8 per cent.; small mononuclear, 35 per cent.: eosinophile, 0.75 per cent.

The patient states that she feels very well, better than at any period since 1895, yet emaciation is growing pronounced.

The apex-beat is in the third interspace, 3 cm. to the right of the left nipple, and the upper border of cardiac dulness is at the upper border of the second rib.

The abdominal and thoracic superficial veins of the skin are more prominent.

During the past year there has been at infrequent occasions a tendency to bleed from the gums, the blood oozing from the surface, which is somewhat spongy. There have been no hemorrhages from any of the other mucous surfaces or from the kidneys.

At no time was the plasmodium malarie ever present in her blood, which was frequently examined, nor were there ever any nucleated red cells or a poikilocytosis. The largest number of red cells was 4,800,000, the smallest 3,800,000; the highest hæmoglobin percentage was 80, the lowest 65. Considering that the patient is a woman, the hæmoglobin percentage is not much less than normal, though recently a tendency to an anemia of the chlorotic type is manifest.

There has never been any œdema of the feet or legs, nor of the skin anywhere, and no ascites.

The body temperature has always been normal and never was higher than 99° for the evening temperature.

Maximilian R., the third patient, is thirty years old. He is married and has a healthy boy, aged one year. He has been under my observation since 1885. He had most of the infectious diseases of childhood at various times up to his ninth year, including measles, whooping-cough, chicken-pox, and scarlet fever. He was not robust until after his ninth year, when he gradually developed into a sturdy boy. He is in the tobacco business and never missed a day from business on account of illness until the past summer. He has never had malaria, rheumatism, gonorrhœa, syphilis, rachitis, or tuberculosis.

Up to 1889 there was no splenic enlargement; he had been examined frequently by me during these years in the course of a number of attacks of bronchitis.

After learning that his sister had an enlarged spleen, and knowing that his youngest brother had died about seven years before with a similar disease, he came to me in March, 1889, for an examination. The result was as follows:

The patient was a well-nourished, thick-set young man, with good color, short in stature, and muscular. His general appearance indicated health. Across his nose and on either side of the cheek was an erythematous patch, with a few red papules. His skin was moist and covered with sudamina. He says he perspires very freely at all times. Pulse was 76 and strong; respirations, 20. He had no complaints of any kind and asked for an examination to determine whether he had, as he called it, a spleen, meaning an enlarged spleen. The thoracic organs were perfectly normal.

On palpating his abdomen the edge of the spleen could be felt, on deep inspiration, with the fingers well under the costal arch; percussion, however, showed dulness in the post-axillary line at the lower border of the seventh rib, which I took to be the upper border of the

spleen. The spleen was evidently enlarged upward. There was no increase in the relative proportion of white to red blood-cells.

The patient was immediately put on arsenic, which apparently produced a diminution in the size of the spleen, for my notes of April, 1890, show that the upper border of splenic dulness was in the eighth interspace, in the post-axillary line. In July, 1890, he consulted me about frequent epistaxis, occurring every few days, and about the erythema on his nose and face. The upper border of splenic dulness on this occasion was on the ninth rib; a still further reduction in the size of the organ. No blood examination was made on this occasion.

He was informed of the necessity of keeping up with his Fowler's solution and reporting to me occasionally. After this I saw the patient very seldom, as he felt in perfect health and entered upon an active business career. He visited me about twice yearly.

In August, 1893, he came again to me, complaining once more of frequent epistaxis, and with a still more vivid erythema of the nose and face. He had in the meantime consulted numerous dermatologists about the inflammation of the skin over his nose and cheeks, but without benefit. On this occasion he had an attack of nose-bleed in my office, and I found on rhinoscopic examination a general surface oozing from the nasal mucous membranes. This was controlled by packing with styptic cotton. On examining his abdomen I discovered the splenic edge to be distinctly palpable a trifle below the free border of the ribs. The upper border of splenic dulness was again over the lower border of the seventh rib, as it was in March, 1889. He told me he had been careless about taking his arsenic, which he had not taken at all for a long time.

A blood-count on this date showed red cells, 5,400,000; white, 7168; hæmoglobin, 90 per cent. (Gowers). No plasmodium malarie was present in three successive examinations made during the week.

The urine was light yellow; specific gravity, 1014; acid; no albumin, no casts, no sugar; urea, three grains to the ounce; sediment of triple phosphates and urates. There was still profuse perspiration and sudamina covered the skin.

From this time on the patient consulted me frequently and took his arsenic conscientiously, yet there was no diminution in the size of the spleen, nor was there any increase. As with his sister, a systematic course of mercurial inunctions and the administration of large doses of iodides were given, but with no effect on the organ.

During this period and for the next four years he considered his health to be perfect, his only complaints being an occasional epistaxis and the erythematous patch on the nose, with troublesome sudamina, especially in the summer months.

Periodical blood examinations, the details of which would be tiresome, showed the lowest number of red blood-cells, 4,200,000, with hæmoglobin at 80 per cent. (September 21, 1896); the highest, 5,400,000, and hæmoglobin at 90 per cent. (February 24, 1897). The lowest number of white blood-cells was 5632, the highest 8292. The differential count of the white cells during these years showed a normal percentage of polynuclears, large and small mononuclears, and eosinophiles.

During this period of four years he was treated with a number of drugs, including various preparations of iron, muriate of quinine in large doses, sodium and strontium iodide, ergotin, and mercury. He

kept fairly well to his arsenic and iron, and the spleen apparently showed no further enlargement. Being informed of this he married in 1897. During 1897 and the early part of 1898 he gained constantly in weight and looked the picture of health. From May, 1898, the spleen began to increase again in size and continued to increase, which it is doing even at the time of this writing, with a period of very rapid growth since the beginning of May, 1900. Numerous blood examinations were made during this period in which not even an anemia of chlorotic type could be established, as the hæmoglobin was never lower than 80 per cent. Since October, 1899, yellowish, cuneiform, thickened patches of conjunctiva, similar to those of the sister, developed in each eye, the size of the patches being identical. The color of the healthy sclera is white. The patient is diminishing in weight, yet he says he feels perfectly well. In fact, he was very active in his business during this period, making trips into the country and out West, where he was compelled to rough it and live on all kinds of primitive food.

At no time were there any abnormalities in the urine.

With the enlargement of the spleen the liver kept pace, both pushing upward against the lungs and forcing the heart upward and to the right.

No enlarged glands can be felt anywhere. With the exception of an attack of indigestion in January, 1900, he did not require any medical service.

In August of this year, while at Avon, N. J., where he had spent the past two summers, he was seized with a chill, his temperature speedily rose to 106.5° F., and he became delirious. During this attack he was treated by the local physician, who pronounced his disease, according to the patient's statement, as "bloody dysentery." I was informed that the patient had numerous loose evacuations from the bowels containing blood and mucus. He was greatly weakened and emaciated by this attack, which was followed during convalescence by an attack of hemorrhagic furunculosis similar to the one which followed the attack of typhoid in the sister, the signs of which are still visible in the pigmentation of the skin wherever there had been a furuncle. On his return to the city he consulted me, when a physical examination revealed the following:

Status on October 3, 1900. There is considerable emaciation. The skin of the face, especially on the forehead, shows pigmented spots and a few healing hemorrhagic furuncles. Pigmented spots most marked over anterior surfaces of the legs. A few hemorrhagic furuncles are on the outer side of the left leg and thigh. A few pigmented spots on the chest, abdomen, and arms are seen. The color of the skin is a sort of brownish-yellow, not at all like icterus, very peculiar and different from any appearance of cachexia that I have ever seen. It is not the pallor of any of the forms of anemia or of carcinomatosis. There is no pigmentation of the mucous surfaces of the lips, gums, or mouth. The tonsils are not large, and there are no enlarged lymphatic glands anywhere to be felt. The skin of the nose and of the adjacent sides of the cheeks is still livid red, and sudamina are distributed generally over the surface of the body, which is moist. No pain or tenderness can be elicited by pressure over the bones.

The shape of the patient's trunk is more anomalous than ever, the bulging in the regions of the liver and spleen being much more pro-

nounced, giving to his entire trunk the shape of a barrel. His chest is thirty-four inches in circumference, his upper abdomen thirty-seven and a half inches, and the lower, at the waist, thirty-three inches (Fig. 3). Pulse, 100, soft, and shows no increased tension. The respirations are hurried, 30 to the minute, short, and somewhat labored. (He never had dyspnoea before.) This is due partly to the pressure of the enlarged organs upward, but greatly to the anæmia, which the examination of his blood will later show.

The apex-beat of the heart is in the *third interspace*, 3 cm. to the right and above the nipple. The upper border of cardiac dulness is at the lower border of the first rib, the right border over the middle of the sternum. The beat is fairly forcible. There are no cardiac murmurs.

FIG. 3.

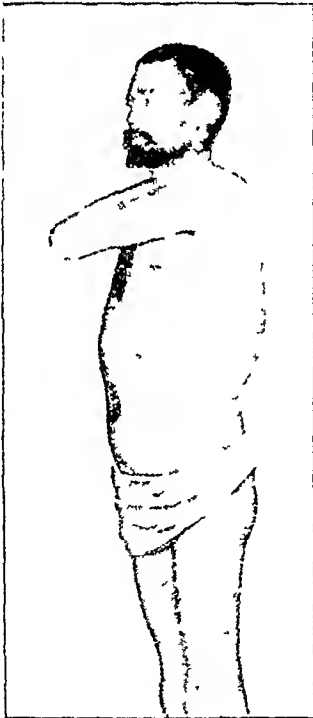
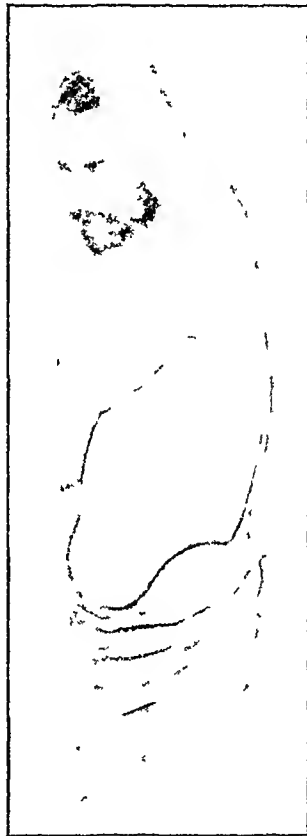


FIG. 4



The lungs show marked dulness from the fifth rib downward, with diminished breathing and absent voice. There is no fluid in either pleural sac. The dulness is due to the compression.

The abdomen protrudes in front, the sides above bulging to a great extent. There is marked tenderness over the liver in spots and a similar tenderness over the spleen, especially below the costal margin.

The area of splenic dulness begins above, at the upper border of the fifth rib, in the midaxillary line, and can be traced behind to the spinal column (Fig. 4), which it touches at the seventh dorsal vertebra.

The posterior edge of the spleen can be distinctly palpated below the twelfth rib, where it rests along the lumbar vertebra, and then curves forward to be finally lost to the touch behind the crest of the ilium. In front the anterior edge of the spleen emerges from the costo-chondral border in the parasternal line and proceeds downward and toward the mesial line, which it reaches at 3 cm. above the umbilicus, where it presents a distinct notch; from the notch the border proceeds transversely across the mesial line of the abdomen, bends down suddenly and curves 4 cm. beyond the middle line back again to the lateral part of the iliac region, where it meets the posterior border behind the crest of the ilium. The accompanying photograph, with the borders of the organ marked on the skin being mapped out by palpation and percussion, shows the enormous size of the organ better than a description (Fig. 4).

The liver dulness begins above in the mammary line, in the fourth interspace; the lower border of the liver can be easily felt; it extends to 6 cm. below the costal margin in the same line and 8 cm. in the anterior axillary line. It distinctly bulges out the right lower thoracic and upper hypochondriac regions.

The surfaces of the spleen and liver are uniformly smooth and present neither nodules nor irregularities. There is no ascites, nor has there been any oedema anywhere.

The superficial veins of the abdomen are not unduly prominent.

The urine is normal in amount; its color is yellow, specific gravity, 1020; urea, four grains to the ounce; no albumin, no casts, no sugar, no bile; some indican.

The blood examination reveals a considerable reduction from former examinations in the red cells and in the haemoglobin. Red cells, 3,800,000; white, 5,120; haemoglobin, 55 per cent., showing an anemia of chlorotic type. The differential count shows polynuclear neutrophils, 54 per cent.; large mononuclears, 10 per cent.; small mononuclears, about 36 per cent. (a little less), and eosinophiles, 0.25 per cent. There were no nucleated red cells, no poikilocytosis. A very few microcytes were visible.

There has been no fever since the third day after his chill, in August, 1900.

DIAGNOSIS. The distinctive features of the last two cases are—

The enormous enlargement of the spleen, that of the sister being larger than that of the brother.

The enlargement of the liver, that of the brother being the greater.

The profuse perspiration and sudamina.

The absence of anemia for more than ten years after the disease had been established.

The tendency to hemorrhage, manifested in the occasional oozing of blood from the gums in the sister, in an occasional epistaxis in the brother, and in the attack of hemorrhagic furnuculosis in each.

The peculiar brownish-yellow (non-icteric) color of the skin.

The long duration of time since the disease began.

The feeling of comfort and ease, notwithstanding the enormous size of the spleen and the pressure upon the thoracic viscera.

The yellow, wedge-shaped conjunctival thickening on each side of the cornea of each eye; these do not in either case look like pingueculæ.

This complex of symptoms, it will be shown, is sufficient to exclude these cases from the group of cases of splenic anaemia and justify placing them in a special group.

Chronic enlargement of the spleen is not rare. In fact, in malarial districts of the Southern States it is quite common and is familiarly known there as the "ague-cake." In such cases it seems to bear a direct relation to the intensity and virulence of the malarial infection.

It also occurs in interference with the portal circulation either directly, such as in cirrhosis of the liver, portal thrombosis, continuous pressure on the portal vein from any cause, etc., or indirectly through the interference with the venous circulation as a result of cardiac disease.

It occasionally occurs as a manifestation of syphilis, rachitis, and tuberculosis.

Amyloid disease of the spleen produces a considerable enlargement of the organ. It is the secondary consequence of suppuration in some other part of the body. Enlargement accompanies leukaemia, Hodgkin's disease, and occurs in splenic anaemia. It is also due to abscess and echinococcus invasion of the spleen.

Lastly, a chronic enlargement of the spleen occurs, with new growths arising in the organ either primarily, which is uncommonly rare (primary carcinoma or sarcoma has seldom been observed), or secondarily from metastasis from other organs (even secondary carcinoma or sarcoma is quite uncommon).

In our cases we have been unable to determine to what the splenic overgrowth is due. From the clinical history malaria, rachitis, tuberculosis, and amyloid disease can be eliminated. The absence of fluctuation determines that the enlargement is not an echinococcus cyst. The duration of the disease excludes all the forms of malignant neoplasms. The absence of heart disease and of primary cirrhosis of the liver excludes a hyperplasia due to passive congestion, as does the tremendous size of the spleen in our cases. Banti's disease, which is a cirrhosis of the liver accompanied by a splenomegaly, is entirely unlike this group. The result of the blood examinations positively excludes leukaemia.

Cases of splenic anaemia have much in common with our group of cases and yet, I think, are very distinct. The features in common are the splenic enlargement, the occurrence in adult life, the chronicity of the affection, the hemorrhagic tendencies, and, perhaps, the anaemia. In splenic anaemia the duration of the disease is much shorter than in our group. In the former the average length of life after the discovery of splenic enlargement is two years; in the latter it has not as yet been determined, but two of my cases present a prolonged progres-

sive splenic overgrowth, in one for at least eleven years, in the other for fifteen years, the patients being still in a fair condition of subjective health. Osler¹ has reported a case of splenic enlargement and anæmia which lasted at least twelve years, and which was accompanied by a high degree of anæmia of the chlorotic type and by repeated attacks of melæna and hæmatestesis. The spleen was not nearly as large as in that of any of my cases.

Anæmia is not a marked symptom in our group and began very late, only after an intercurrent affection, while it is an early and prominent symptom in the patients with splenic anæmia. Still, it should be mentioned that Osler says that anæmia was more commonly absent in his cases of splenic anæmia (*THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, 1899, p. 54) than present (Osler, *Text-Book on Practice of Medicine*, article "Splenic Anæmia"). This fact might make some of his cases analogous to ours.

Patients with splenic anæmia have been at times amenable to treatment. Our patients have grown progressively worse, notwithstanding all methods and means of treatment.

The peculiar color of the skin in our cases is entirely different from the pallor of splenic anæmia.

I cannot say whether the peculiar conjunctival changes are pathognomonic of our group. I have never seen them mentioned as occurring with other forms of splenomegaly, nor have pingueculæ been described as occurring in such cases.

Quite characteristic of our group of cases is the feeling of comfort and well-being and the remarkable absence of any subjective signs of distress, even with the enormous overgrowth of the spleen and liver crowding up the thoracic viscera.

LITERATURE AND PATHOLOGY. When one comes to examine the literature connected with cases of primary splenomegaly he soon discovers the darkness in which the pathology of the spleen is concealed. The various non-leukæmic splenic enlargements have been variously denominated according to whether they were considered as heteroplastic growths or as a hyperplasia. The confusing nomenclature regarding the nature of primary splenomegaly arose partly from the various theories held by the different authors. Cases thus appear in the literature under the lymphatic tumor groups with the following various names: Lymphosarcoma (Virchow), malignant lymphoma (Billroth), malignant non-leukæmic lymphadenoma (Orth); also as Hodgkin's disease, adenie (Trousseau), pseudoleukæmia (Colnheim), lymphatic anæmia (Wilks). Even the term splenic anæmia has been used to denote various conditions. Thus Griesinger, in describing a splenic form

¹ *Edinburgh Medical Journal*, May, 1899.

of pseudoleukæmia, called it splenic anæmia. He used the term for the first time. He was followed by others who gave the same name to cases of splenic enlargement in which there was no involvement of the lymphatic glands. A different significance was given to this term when von Jaksch described a series of cases occurring in children presenting the clinical complex of anæmia—intense leucocytosis, very large spleen, and, seldom, enlarged lymphatic glands. He called these cases “anæmia pseudoleukæmia infantum,” while Somma had called the identical class of cases splenic anæmia. Glockner classified the same kind of cases under the same term as Somma. In describing his cases the last author speaks of the presence of numbers of peculiar epithelioid cells in the spleen pulp—a condition which Bovaird also described under different terms in his case and whose interpretation has puzzled all pathologists who have described these cells. They have not been able to say definitely whether the cells represented a neoplastic formation or not. Such authorities as Robin, Weichselbaum, Bireh-Hirschfeld, and others have been unable to decide the question.

The only cases heretofore recorded which the writer believes are similar, if not identical, to his cases are six in number. They are described by Gaucher,¹ Picon and Ramond,² William Collier,³ Weichselbaum,⁴ and Bovaird.⁵ The last named, in his recent article, has referred to these cases so fully that it is needless to reconsider them.

I think it is fair to assume that the child, the youngest of my three cases, who died at nine years of age with a splenic enlargement, was a case of this disease. If we can accept the case of Weichselbaum—one of a soldier from whom a very large spleen, which followed an injury to his side, was removed by operation, and which Bireh-Hirschfeld regarded not as an endothelial sarcoma, as Weichselbaum called it, but an ordinary large-celled hyperplasia—as one of this disease, his and mine are the only cases recorded as occurring in males, the cases of Gaucher, Picon and Ramond, Collier, and Bovaird being in females.

Females seem to be more afflicted than males. Collier and Bovaird each report two females in each of their reported families as afflicted with the disease, while my cases are three in one family, two of them being males. The disease, perhaps, has a relation to some perversion of visceral development occurring in families.

The time of development of the disease in this group varies. In

¹ E. Gaucher. Thèse de Doctorat: “Splénomégalie primitive—Épithélioma primitif de la rate.”

² Picon et Ramond. “Hypertrophie de la rate.” Arch. de méd. exp. et anat. path., 1896, viii., 168.

³ William Collier. “Case of Enlarged Spleen.” Transactions London Pathological Society, 1895, xli., 148.

⁴ Weichselbaum. “Primäres multiplen Endothelsarkom der Milz.” Virchow's Arch., 1881, lxxxv., 562.

⁵ David Bovaird, Jr. THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1900, cxx., p. 377.

one of my cases (in the child who died) it evidently began in the third year of life. In the woman it cannot be definitely stated when it began, because no physical examination of the abdomen had been made until the enlarged spleen was apparent to her; it may be presumed, however, from the size when it was first discovered and its subsequent progress in growth that it began about three years before, in her nineteenth year. In the man it positively did not begin until his eighteenth year. In this respect two of my cases differ from Bovaird's; in both of his it began in early childhood. It likewise began in childhood in Gaucher's case.

It is not my intention to discuss the pathological anatomy of this group of cases. The subject is still involved in doubt. Bovaird's experience with his specimens and the various opinions expressed by the pathologists to whom he submitted them is but a repetition of the experience of Collier, Weichselbaum, etc. None could say absolutely whether Bovaird's case represented an endothelioma, in the ordinary acceptation of the term, or a hyperplasia. This doubt shows the difficulty of the problem.

From a clinical stand-point I may say that this affection of the spleen does not produce any serious altered blood states such as one would be led to expect in a destructive process involving the cells of the spleen. Morphologically the spleen in these cases is still a spleen, and histologically the cell elements were much increased in number, giving rise to a true hyperplasia—conditions which are borne out by the clinical phenomena.

As to the increase in the size of the liver in these cases, the explanation is based on purely physical grounds. I do not regard it as metastatic, notwithstanding in Bovaird's case the same kind of cells which had been found in the spleen were found in the liver. Clinically, the increase in size is that of an ordinary hyperplasia. When we consider that in my cases the hepatic enlargement was not coincident with but later than the splenic overgrowth, and that it occurred some years later in both the adult cases, we must look to the cause of the enlarged liver in the spleen. The following facts will, I believe, explain it:

1. All the venous channels in the spleen were enlarged in Bovaird's case, and it is fair to assume they are in mine.

2. With the increase in the size of the spleen more blood is sent to it, and consequently more is returned from it through the splenic vein. As a consequence—

3. More blood is carried to the portal vein, which is formed by the junction of the splenic and superior mesenteric veins. Hence the liver receives more than its natural portal blood-supply, the hepatic cells are put to greater activity in the necessary metabolism of this increased blood-supply, and a hypertrophy and finally a hyperplasia naturally

result. An analogous process occurs in the spleen in some cases of cirrhosis of the liver just in this way.

From what has been adduced it may be held that my cases correspond only with those described by Gaucher, Picon and Ramond, Collier, Weichselbaum (even doubtful), and Bovaird. While there is a similarity between the cases called splenic anemia and some of this class reported by Sippy¹ and Osler, there are sufficient data to include our group of cases under a special class.

Gilbert and Fournier² mention seven cases of children with splenomegaly accompanied by cirrhosis of the liver and speak of them as cases of splenomegalie hepatic cirrhosis. They call attention to the stunted growth of the patients and to certain changes in the bones and joints.

Frederick Taylor³ reports three cases similar in most of their features to those of Gilbert and Fournier. These cases while having much in common are yet not alike; some of the former seem to me to be cases of splenic anemia and of Banti's disease. This is especially true of the first two of Taylor's cases, which are undoubtedly cases of Banti's disease. As to his third case, it approaches in only a few characters the group in which my cases form a distinct division and yet differs in many of its clinical features from mine. My cases were not stunted in growth, had no clubbing of the terminal phalanges, had no ascites, and no icterus. The peculiar color of the skin in my cases was of very late development, came on gradually, and increased in intensity slowly. There never was any bile in the blood or in the urine of my patients and their stools were never free from bile. On this account I do not regard their color as icteric. It does not look like any form of icterus that I have ever seen. The third case of Taylor's was jaundiced shortly after an attack of scarlet fever at the age of about eight years, after which his splenomegaly began and presented the signs of arrested development just mentioned. The spleen in my cases is larger than in any of the cases referred to.

There has recently been a discussion before the Société Médicale des Hôpitaux (April 1, May 2, 18, and 25, 1900) of cases of splenomegaly some of which were associated with a cirrhosis of the liver and some were not. M. Chauffard, in opposing the position taken by M. Gilbert on this topic, suggested the classification of such cases into three groups, viz.:

1. Cases in which the spleen and liver appear to be simultaneously affected and in almost equal degree. He suggests the name of splenomegalie hypertrophie biliaire cirrhosis for this class.

¹ THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, November, 1898.

² Gilbert et Fournier. "La cirrhose hypertrophique avec ictère chez l'Enfant." *Revue mensuelle des Maladies de l'Enfance*, 1895, No. xiii., p. 309.

³ Frederick Taylor. "Cirrhosis of the Liver in Children." *Guy's Hospital Reports*, 1895, iii., p. 45; also 1897, iv., p. 1.

2. Cases in which the spleen is distinctly and markedly affected before the liver and to a much greater degree. In these cases the hepatic changes are secondary and dependent on the splenomegaly. He would call these cases *metasplenomegalie hypertrophie biliary cirrhosis*.

3. Cases in which the enlarged liver precedes and determines the splenomegaly—"presplenomegalie hypertrophie cirrhosis."

These French authors, however, have confounded the various types of disease which we speak of as *hæmochromatosis* (v. Recklinghausen), Hanot's disease, and *diabète bronzé* with some cases of splenic anemia, and cirrhosis of the liver combined with splenomegaly (Banti's disease). I do not think any of their reported cases are like mine.

Nothing is gained by a classification such as M. Chauffard suggests, as it neither indicates the character, cause, or pathology of any of the diseases of the groups.

I can furnish no further explanation of this affection, and all that can be said about this special class of cases is that they represent probably a family disease whose essential characteristic is a progressive splenomegaly. When the physiology and pathology of the spleen become known it may be possible to refer this class of cases to its proper place in medical nosology.

ENTEROPTOSIS.¹

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THE ptoses of the different abdominal viscera are so closely associated, forming, as they do, parts of one great disease picture, that it is unscientific and unsatisfactory to select for discussion one dislocation, such as gastropptosis or nephropptosis, and thrust upon it, as is sometimes done, the dignity of a special disease. It is usually but one manifestation of enteroptosis. Almost never do we find gastropptosis without a dislocation of one or both kidneys, the colon, and the small intestines. Often there is also dislocation of the uterus, less frequently of the liver and the spleen. It is true that the symptoms and anatomical signs on the part of the stomach may predominate in one case, while in another those of the kidneys are the more striking. It is also true that though these organs may be greatly dislocated, the patient may complain of no symptoms that would direct special attention to them.

My experience with this condition during the past few years has con-

vinced me that it is a remarkably common disease, that it is very seldom recognized or examined for by the profession at large, and that a dissemination of knowledge of the disease would be of great worth to the profession and of untold value to suffering womanhood.

There is no disease of more importance to the general practitioner than enteroptosis, since it is endemic the world over, and he is usually first to be consulted by such patients. A familiarity with its symptom complex and a knowledge of the correct methods of diagnosis will relieve him of much worry and vexation of spirit by explaining many an obscure problem in practice.

The patients who are an easy prey to the allurements of patent medicines and quacks are often enteroptotics. They are well described in a patent medicine advertisement as flotsam and jetsam, driftwood—the patients who drift from one physician's office to another; who go the rounds of hospitals and finally give up in despair, reconciled to the belief that treatment of their condition is useless. This class of cases is the bane of the physician's life—the atonic, enfeebled, ill-nourished patients, so poorly equipped with vital force that every physiological function from digestion to thought is seriously impaired. The patient is literally and figuratively run down, as much so as a clock when its mechanism no longer furnishes the impetus to go. These are the cases which every day are being diagnosed as neurasthenia, spinal anemia, nervous exhaustion, nervous dyspepsia, and change of life.

In this article I shall confine myself rather closely to a statement and discussion of the facts gleaned from an analysis of eighty cases of enteroptosis taken from the records of the medical clinic. I shall avoid citations from numerous authors and shall give but a brief history of the disease.

HISTORY. In 1853 Virchow called attention to the displacements of the intestines which arise through circumscribed peritonitis and obstruction of feces. While working upon diphtheritic dysentery he was struck with the frequency of the dislocation of the abdominal viscera. Indeed, his post-mortem experience led him to make the following statement: "In almost all adults partial states of dislocation of the viscera, and especially of the intestines, occur so frequently that more people have this displacement than a normal location of the intestines."

The intimate relation existing between a large group of symptoms and dislocations of the abdominal viscera entirely independent of inflammatory conditions in the abdominal cavity was first brought prominently before the medical profession by Glénard, of Lyons, France, in 1885. Although other clinicians—Stiller, for instance—claim to have been familiar with these cases long before the publication of Glénard's article, he is given credit for having given to enteroptosis the dignity of a distinct disease. Thus we may distinguish the enterop-

tosis of the clinician and the enteroptosis of the pathologist. Glénard devoted considerable attention to the *modus operandi* of the development of enteroptosis, to the explanation of symptoms as secondary to the anatomical conditions and to treatment. Ewald and Boas proved that the "cord colique tranverse" of Glénard was simply the normal pancreas, which is sometimes easily felt in these cases. Einhorn and Hemmeter have called attention to the frequency of enteroptosis in patients complaining of dyspeptic symptoms.

Meinert examined a large number of chlorotic girls and concluded that enteroptosis was a prime cause of chlorosis.

Stiller in particular has called attention to congenital enteroptosis and has emphasized the nervous element in this condition. In important contributions he has called the attention of the profession to a new sign, which he terms the costal stigma, or floating tenth rib. All patients possessing this sign are considered neurasthenic. He believes that the degree of movability of this rib is a fair index of the degree of neurasthenia. He believes enteroptosis and nervous dyspepsia to be identical and uses the costal stigma as an easy means of recognizing both. He contends that Reichman's disease is closely related to enteroptosis, accompanies its highest degrees, and depends, as it does, upon a congenital predisposition.

One soon learns to recognize an enteroptotic at a glance. She has a slender frame, is poorly nourished, pale, tired, has a neurasthenic appearance, drags herself about from morning until night, and is entirely lacking in vivacity and energy. Dunster's jocular definition of woman as "a thing which is constipated and has a pain in its side" applies to enteroptotics.

METHOD OF EXAMINATION. Chest and abdomen are stripped and a careful inspection made, the patient assuming both horizontal and upright positions. There is usually a depression in the epigastrium and a fulness below the navel, especially in the upright position.

In nearly all these cases palpation is very easy on account of the relaxed condition of the abdominal walls. Occasionally it may be necessary to put the patient in a hot bath at 110° F. to make palpation easier. Feel for the tenth ribs to determine whether the costal stigma is present. Palpate the kidneys according to well-known methods laid down in text-books. Examination of the stomach comes next in my routine. I have found that percussion and auscultatory percussion are entirely unreliable for locating the greater curvature in enteroptotics. If the stomach is in its normal position they are fairly satisfactory, especially the latter method. Frequently, using auscultatory percussion, I have noted a change in the tympanic note just above the navel, suggesting that this was the location of the greater curvature. Inflation a moment later demonstrated that this was the lesser curvature

in a dislocated stomach. The demonstration of succussion sounds in the region of the navel is very suggestive of a dislocated, dilated, or atonic stomach. The sounds, however, may come from the intestines. Inflation of the stomach by one of the several methods is the most satisfactory way of demonstrating its size and position. Among the methods in vogue is the tartaric-acid and bicarbonate-of-soda method, the patient drinking half a glass of water containing 6 grammes of acid and following immediately with a similar amount containing 7 grammes of soda. Carbonic acid is generated and the stomach is distended.

Another method is inflation through a stomach-tube by means of a Davidson syringe, Politzer air-bag, atomizer bulb, or bicycle pump. Some physicians prefer attaching a French safe or rubber balloon to the stomach-tube, by this means preventing the escape of air either by way of the duodenum or œsophagus. The advantage in this method is that the amount of air introduced into the stomach can be easily controlled. The disadvantage is that the patient, unaccustomed to the use of the stomach-tube, complains of pain before the stomach is fully distended, and in many cases it is necessary to let the air out before determining the position and size.

Spivak, of Denver, recommends auto-insufflation by the patient. A stomach-tube perforated just within the portion covered by the lips is introduced, the distal portion being compressed, and the patient is told to blow. Occasionally the physician applies his own lips to the tube and blows.

My experience with the acid and soda method has been quite extensive and very satisfactory. It will be found much more useful in private practice than the others, since it is much easier to persuade a patient to swallow a couple of doses of medicine than a stomach-tube. Frequently one wishes to distend the stomach when it is inconvenient to give a test-breakfast.

The auto-insufflation method I have never used. From my experience with neurasthenic women I do not believe they would prove successful auto-inflators. Some theoretical objections are offered to the acid and soda method. In some cases of marked dilatation of the stomach it is true that the usual dose is not large enough. In one such case I found it necessary to double the dose in order to obtain good results. Inflation through the stomach-tube is very useful in cases of dilatation. The patient seldom vomits unless the stomach is distended immediately after meals. Some distress occurs, but this is relieved immediately by belching, the patient sticking her finger down her throat if necessary. In the several hundred cases which I have distended by this method neither hemorrhage nor other unfortunate result has followed, and among the cases have been a number with

cancer of the stomach. Transillumination can be used, but it is not as satisfactory as distention.

It is well to palpate the liver and spleen in both the upright and horizontal positions. These organs may appear dislocated only in the upright position. The pancreas is often felt by the educated hand from one to two inches above the navel. Such an examination consumes a very few minutes.

The statistics which follow are the results of an analysis of eighty cases of enteroptosis taken from the records of the medical clinic. With but a very few exceptions I have examined these cases myself and thus speak from a personal experience rather than from the records of others:

	Total patients.	Total men.	Total women above 16.	Enteroptosis in men.	Enteroptosis in women.
Last three months of 1892	68	43	20	0	0
Entire year of . . . 1893	207	157	50	1	0
" " 1894	238	154	84	0	0
" " 1895	238	180	58	1	2
" " 1896	189	144	45	3	0
" " 1897	232	179	73	6	0
" " 1898	288	195	90	12	1
" " 1899	362	259	103	35	4
First four months of 1900	142	96	46	11	4
	2004	1415	569	69	11

From October, 1892, to the end of December, 1896, only seven cases are recorded. Since the latter part of 1897 I have paid more attention to the demonstration of this condition, especially during the past two years, with the result that the number of cases has increased remarkably. Thirteen cases were recorded during 1898, 39 during 1899, and 15 during the first four months of 1900. It is evident that accurate statistics can be obtained only by a careful routine examination of all cases, as there is a large number of the so-called cases of compensatory enteroptosis—patients with the anatomical conditions, but minus the symptoms. Realizing that enteroptosis was much less common in the male and more difficult to recognize, on account of the rigid abdomen, I have distended the stomachs only in those whose symptoms pointed directly to that organ. If my examinations had been more frequent it is quite probable that the number of cases observed in men would have been much larger.

In this series of 80 cases 69 were women and 11 men. In 24 cases both kidneys were dislocated, the right usually showing greater dis-

location than the left. As a rule, they were freely movable, it being possible to grasp the entire organ by the palpating hands. In 33 cases the right kidney alone was dislocated; in some only the lower half could be felt on deep breathing. In 4 cases the left kidney alone was dislocated. In 7 cases no notes concerning dislocation were found.

Only lately have I been paying special attention to Stiller's phenomenon—the costal stigma or floating tenth rib. In 8 cases the tenth ribs were distinctly floating; in 7 cases they had membranous attachments; in 65 cases there were no notes, as these patients were examined before special attention was called to this sign.

Position of the Stomach. In 69 of the 80 cases the stomach had fallen from its normal position. In 28 there was a high degree of dislocation, the entire organ lying below the navel. In 41 the prolapse was of moderate degree, the greater curvature being from two to three inches below the navel, the lesser from one to two inches above. All save 12 of these cases were distended with acid and soda. In the 12 not distended succussion sounds were present below the navel. In 3 of the 80 cases the stomach was not dislocated; in 8 there were no notes on this point. In a few cases there was both dislocation and dilatation. In several cases the colon was inflated and was found to have fallen toward the middle line and below the navel.

Analysis of the Stomach Contents. Thirty-six out of the 48 cases analyzed had a total acidity of 50 or below, 2 between 50 and 60, 4 between 60 and 70, 3 between 70 and 80, and 3 between 80 and 90. There were no notes on 32 of the 80 cases. These figures are based upon our old method of determining total acidity, which differs from the method used during the past year, in that formerly—using phenolphthalein as an indicator—the reaction was considered complete when addition of the decinormal NaOH solution produced the faintest pink. At present the reaction is not considered complete until a pink is obtained which does not deepen on the addition of NaOH. This means an additional two or three drops of the decinormal solution.

Using the method in vogue during the past year, a complete stomach analysis has been made in 16 of our cases. Of these 9 had a total acidity of about 50 or below, 7 above 50.

Blood. Examination was made in 23 cases. Of these 9 had a chlorotic condition; 13 were more or less anæmic, but not chlorotic; 1 was normal; 57 had no blood notes. In 13 of the 23 hæmoglobin was 70 or above; in 10 it was below 70.

Confinements. Thirty-five out of 56 women bore children, varying in number from one to eight; 20 never bore children; 1 had an abortion. In 13 there were no notes.

Age. In the second decade, 1; in the third, 32; in the fourth, 19;

such operation. I will venture the assertion that the majority of cases operated upon for floating kidney were never examined as to whether stomachs and colon were not likewise dislocated. In most cases of general enteroptosis nephrorrhaphy will be of no benefit. I am familiar with several striking examples which illustrate the truth of this statement.

In gynecological practice a large number of women with displacements and torn perineæ have distressing nervous symptoms. The specialist, taking a narrow view of the case, performs anterior fixation, uses pessaries, repairs the perineum, and is disappointed in the results of his treatment. Many of these cases are enteroptotics, and the symptoms are as much dependent on dislocated stomach, kidneys, and intestines as upon retroversion and antelexion. Operation is advisable in cases accompanied by hydronephrosis and Dietl's crises, in which we have pure mechanical disturbances resulting from a kinking or twisting of the kidney vessels which could occur only when this organ was dislocated. Stengel and Beyea report a case of apparently congenital enteroptosis, whose symptoms were chiefly gastric, in which nephrorrhaphy performed by J. William White did not relieve the symptoms, though the kidney remained in place. Later, the operation of taking a tuck in the gastrohepatic omentum and gastrophrenic ligament was performed and the stomach brought into what seemed almost normal position. Following this operation the stomach symptoms were relieved, the patient was able to eat freely without discomfort, appetite improved, and she gained nineteen pounds. Eight months after operation the greater curvature was one and a half inches below the navel.

In cases having severe gastric symptoms requiring morphine and not relieved by other means at our command, such an operation should be considered.

Abdominal bandages or belts with properly applied pads may relieve symptoms in some cases. They should be applied with the patient in the knee-chest position or lying on her back, with the hips elevated. Reclining in bed often relieves the dragging sensation. In some cases in which the stomach symptoms are prominent, occasional lavage and the use of dilute hydrochloric acid (if there is subacidity) are useful. Exercise and massage of the abdominal muscles are of great value, but can seldom be satisfactorily carried out. I have seen many cases improve remarkably under the use of tincture of *nux vomica*. The method in vogue in Dr. Dock's clinic is to begin with 10 or 15 drops before each meal, increasing 1 drop daily until as high as 70 or 80 drops are taken. This medication should be combined with over-feeding. The general tone of the system is greatly improved, the nervous symptoms especially being relieved; the patient puts on flesh and in every way, with the exception of the dislocations, is greatly benefited.

If the stomach is dilated or if there is retention of food as a result of kinking in the duodenum, gastric lavage should be used as indicated. There must be a great deal of individualizing in the treatment of this condition.

THE ESTIMATION OF THE URINARY SULPHATES AND OF THE FECAL FAT IN THE DIAGNOSIS OF PANCREATIC DISEASE.

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(From the William Pepper Laboratory of Clinical Medicine, Phoebe A. Hearst Foundation.)

A REDUCTION in the amount of ethereal sulphates in the urine has been thought to be a possible sign of pancreatic disease, for the following reasons: The production in the intestine of the substances which are finally largely excreted in the urine as so-called ethereal sulphates, is dependent upon the putrefaction of protein, and this process is due to bacterial activity. Bacteria are able to break down native albumen in only relatively small amounts, while they readily decompose comparatively large amounts of the products of proteolytic digestion. If, therefore, there were little or no proteolytic digestion going on in the intestine, as is the case in severe disease of the pancreas, the products of bacterial activity (the indol, skatol, etc.) would be largely decreased, and there would, consequently, be a reduction in the ethereal sulphates of the urine. The brief literature concerning the value of estimation of the ethereal sulphates will be reviewed after the report of two cases which are of some interest in this connection, since in both the diagnosis was ultimately made clear—by the post-mortem examination in one instance and by the subsequent clinical course in the other.

The first case occurred in a man, aged thirty-six years, who was under Dr. Stengel's care at the University Hospital. He gave a history of spasmodic attacks of colicky pain above and to the right of the umbilicus, radiating toward the left. The first attack occurred in May, 1900. The pain was subsequently felt a number of times, though the first attack was decidedly the most severe. There was an indefinite history of slight jaundice accompanying the attacks. Between the time of the first spasm of pain and his admission to the hospital in November there was a loss of about forty pounds in weight; but, excepting for the emaciation and the attacks of pain, the only symptoms had been indefinite but continuous discomfort in the epigastric region and severe constipation. Upon admission nothing could be discovered by physical examination with the exception of slight enlargement of the stomach, absence of HCl from the stomach contents, and slight stagnation of the contents.

Oppler-Boas bacilli, lactic acid, and pus cells were absent from the stomach contents. The liver seemed normal. Nothing abnormal could be felt anywhere; there was, however, slight tenderness on deep pressure in the lower epigastrium. A few days after admission the man began to show jaundice, which was slight at first, but increased rapidly and became intense in about a week. There was a very rapid increase in the signs of stagnation in the stomach, and in the enlargement of the stomach, together with the appearance of violent peristaltic movements of this viscus. The constipation was pronounced and difficult to overcome. The most striking symptom exhibited was an astonishingly rapid loss of strength and flesh. During the last two weeks of his life deep resistance, without any definite limitation of its borders, was felt in the lower epigastrium. The case was thought to be pancreatic carcinoma, and estimations of the preformed and ethereal sulphates of the urine were undertaken, and orders were also left for the feces to be sent to the laboratory. Unfortunately, these orders were not carried out. Estimation of the sulphates gave the following figures: Preformed, 2.495 grammes; ethereal, 0.085 gramme. On a second day, preformed, 2.3086 grammes; ethereal, 0.115 gramme. Further estimations could not be made, as I was obliged for several days to be out of town. The absolute values for the ethereal sulphates are very low, and the ratio between the ethereal and preformed sulphates is also in both instances decidedly below the normal, particularly in the first estimation; the normal ratio is about 1 to 10 or 1 to 12, while in this case on the first day the ratio was 1 to 29.4 and on the second day 1 to 20. The man was operated upon two days after the last estimation, and an obstruction of the duodenum and a small mass in the position of the pancreas were found. Gastro-enterostomy was done. The man did well for thirty-six hours and then collapsed and died. Only a partial post-mortem was allowed. This showed a carcinoma of the head of the pancreas completely obstructing the biliary and pancreatic ducts, the latter being absolutely closed for the distance of half an inch at its terminal portion, and behind this being dilated to a diameter of about a quarter inch. There was apparently no accessory pancreatic duct, and hence the obstruction was complete. There was no calculus. The growth had involved the intestinal wall and had caused contraction of the lumen to about the size of one's little finger. The portion of the duodenum above this was much dilated, the pylorus stretched to a diameter of an inch and a quarter, and the stomach widely dilated. There was severe gastritis, with hemorrhagic points scattered over the surface of the stomach, particularly in the pyloric region. The stomach was entirely free from carcinoma. There were a few enlarged glands in the neighborhood of the pancreas. The liver was moderately enlarged, but showed no metastases.

The second case was that of a woman, aged forty-eight years, whom I saw through the kindness of Dr. Musser and Dr. E. P. Davis. She had had some loss of general health and weight, with epigastric discomfort, and a slowly appearing and increasing jaundice, which had persisted at the time I saw her for about a month. There were no definite changes to be determined upon physical examination excepting slight enlargement of the liver, but the course of the case aroused suspicion of pancreatic carcinoma. The estimation of the urinary sul-

phates in this case showed on one day, preformed, 3.268 grammes; ethereal, 0.440 gramme; at a second estimation, preformed, 3.792 grammes; ethereal, 0.444 gramme. The ratio between the two was on the two days 1 to 7.4, 1 to 8.5. The absolute amount of the ethereal sulphates, therefore, was above the normal, and the ratio of the ethereal to the preformed sulphates was likewise above the normal on both days. A short time after I saw her she began to improve, and soon became entirely well and remains so now, one year after the period of her illness.

So far, then, as these two cases go they seem to indicate that a reduction of the ethereal sulphates of the urine may be a sign of value in the diagnosis of severe disease of the pancreas. The observations by themselves are, however, of little value, and the literature upon the subject is meagre. According to Oser, the first practical suggestion of this sign was in the observation by Gerhardt, in 1886, that in a case in which there was apparently obstruction high up in the intestinal tract the indican in the urine instead of being greatly increased, as is usually the case in such conditions, was almost absent. Gerhardt decided because of this that the obstruction was due to malignant disease of the pancreas involving the wall of the intestine. The post-mortem showed the correctness of his view.

Subsequently Pisenti ligated the duct in dogs and showed in two cases that this caused a marked reduction of the indican (which was estimated quantitatively). Stefaniui and Biondi each reported a case of pancreatic disease, one suppurative pancreatitis, the other adenoma, in which indicanuria was absent. Schlagenhauser, however, found the indican increased in a case of interstitial syphilitic pancreatitis. Katz, in the various experiments which he performed with Oser, usually found that lesions of the pancreas caused rather an increase of the indican than a decrease, and de Renzi could not find any distinctive change in the indican in experiments on animals. Oser decides that one is not justified in drawing any conclusions concerning the presence or absence of pancreatic disease from the observation of changes in the amount of indican. With this conclusion everyone must agree, as the indican of the urine is a very uncertain quantity and as a factor in diagnosis is of extremely limited value; but while a rough test of the amount of indican, or even its quantitative estimation, is by no means a satisfactory diagnostic measure, the accurate quantitative estimation of the total ethereal sulphates is of distinct value in many conditions. There have been, however, but few observations concerning the sulphates in the condition under discussion. The first was that of Le Nobel, in 1888, who found that in a case in which there was a glycosuria (probably maltosuria), with very fatty stools and without icterus, the ethereal sulphates were almost entirely absent from the urine, and the intestinal contents showed a practically complete absence of indol,

skatol, and phenol. The salts of fatty acids were also absent from the feces, and Le Nobel believed that there was severe pancreatic disease which accounted for these changes. His diagnosis was never confirmed by *post-mortem* examination. A. E. Taylor showed very low values for the ethereal sulphates in a case in which the presence of cachexia and icterus, with absence of signs of gastric carcinoma or of distinctive signs of disease of the liver or bile passages, made it seem probable that there was pancreatic carcinoma. Taylor also was unable to report a *post-mortem* examination. Northrup and Herter described a case in which there was a mass in the region of the pancreas and the general signs of carcinoma; operation showed a growth which was apparently of the pancreas itself. Herter reports that in this case the ethereal sulphates were not reduced; they were, on the contrary, increased, and particularly in proportion to the preformed sulphates. Katz found the absolute amount of the ethereal sulphates after severe experimental lesions of the pancreas, and particularly after total or partial extirpation, variable but not greatly differing from the normal. Their ratio to the preformed sulphates was also very variable, sometimes very high and sometimes low, but never extremely low and not showing any constant tendency to be low. So far as I have been able to determine there have been no other observations concerning the test.

The summary, then, of the observations is as follows: Katz found it valueless in experimental work on dogs. Northrup and Herter found it negative in a case in which operation apparently showed a large tumor of the pancreas, while Le Nobel and Taylor found it positive in cases in which pancreatic disease may practically be accepted as present (particularly is this statement true in Le Nobel's case), and I found it positive in one case in which autopsy showed obstruction of the pancreatic duct and negative in one in which there was apparently only a protracted catarrhal jaundice. While Katz's work is important, I cannot by any means consider it so conclusive as do Katz and Oser. Observations made upon animals that have been subjected to grave operative procedures cannot alone conclusively settle questions relating to chronic diseases in man. Only a series of observations on man himself will suffice to determine the actual practical value of any test, and the very few reports of this character which I have quoted are apparently in favor of this test. Northrup and Herter's case, which gave a negative result, cannot be considered to be testimony against it, for since an autopsy was lacking it is not known whether the pancreatic duct was obstructed or not, though it probably was.

But looked at more broadly I think the test is, at best, likely to be only an inconstant aid in diagnosis and to be of real value only when positive. Normal or unduly large amounts of ethereal sulphates may certainly be conceived of as being produced even in the absence of

pancreatic secretion from the intestine, since it is known that many bacteria have the power of breaking up undigested protein and may, therefore, produce indol, skatol, and their congeners without the aid of the normal digestive ferments. It is not known to what extent this may occur in the intestinal tract or what proportion of the normal amount of urinary sulphates may be furnished in this way in either diseased or normal conditions. It must be accepted as probable, however, that the amount thus produced may be sufficient to make a negative result of the test of no value as an indication of the absence of serious pancreatic disease. In the same connection it must be remembered that some pancreatic secretion may still be furnished to the intestine when there are severe inflammatory or degenerative changes in the organ, and that small amounts of the secretion may be sufficient to make the test negative. Further, it has been strongly insisted upon by Hansemann and others that new growths of an organ may to a considerable extent carry out the secretory functions of that organ, and this may be considered to be conclusively proved. Sufficient testimony of this is seen in the repeated observation of the secretion of bile by new growths of the liver; striking evidence of this is furnished in the case recorded by M. B. Schmidt, in which channels containing bile and surrounded by cells having the appearance and arrangement of liver cells were found in a sternal metastasis of a liver growth. A similar but even more remarkable observation was that of v. Eiselsberg, who noted the onset of symptoms of myxœdema after removal of the thyroid because of a malignant growth, the subsidence of the myxœdema during the growth of a metastasis, and the recurrence of the symptoms after the removal of the metastasis. The latter proved to have a structure closely resembling that of the thyroid, with acini filled with colloid material. Unless, therefore, a growth of the pancreas completely obstructs its duct the secretory function of the organ may possibly be fully carried out by the remainder of the pancreas or by the growth itself, and any tests of that function may give normal results.

On the other hand, a positive result of the test would not always be conclusive, since values for the ethereal sulphates as low as 100 mg. in the twenty-four hours have been observed by Strauss and Phillipsohn, Rovighi, Winternitz, Biernaeki, Hirschler, Krauss, and others as a result of gastric hyperchlorhydria, closely restricted diet, diarrhœa, and other causes.

If, then, these causes for reduction of the ethereal sulphates are present a positive result of the test would also be of doubtful importance; hence the actual value of the test must be limited, but this does not mean that it is wholly worthless. There is scarcely a test used in clinical medicine that does not have to be carefully scrutinized in the individual case, and in so obscure a condition as pancreatic dis-

ease usually is clinically any test that promises to give aid in diagnosis is worthy of investigation. More observations must be made before definite conclusions can be reached, but it seems probable that we shall be justified in acting as follows: If the test is negative the result deserves little consideration; if, on the other hand, the ethereal sulphates are found much reduced the other factors in the case should be considered in connection with this observation. If there is diarrhœa or gastric hyperchlorhydria, or if the patient is on milk alone or any other diet which very largely reduces bacterial activity, a low ratio of the ethereal sulphates cannot be considered of great importance, nor can much stress be laid on a low absolute value of the ethereal sulphates if the values for the preformed sulphates be coincidentally low. If, however, these factors be not present, and particularly if, with suspicion of pancreatic disease, factors which usually cause an increase of the ethereal sulphates be present and yet the values be found low, the test would at present appear to be of distinct practical importance in diagnosis. Constipation, gastric hypoacidity or anacidity, icterus, grave anæmia, and cachexia are all very likely to cause an increase in the relative or absolute values of the ethereal sulphates. All these factors were present in my first case, and yet the absolute value for the ethereal sulphates was low on the second day of estimation and very low on the first day, while the preformed sulphates were relatively and absolutely high. This result was considered to be a point of distinct importance in the diagnosis of this case, and I believe it would be of importance under similar circumstances. The test does not require more time or skill than one often needs in the diagnosis of new growths by the examination of sections, though it does require rather more concentration of the time expended and a little special skill in chemical work.

AS TO THE IMPORTANCE OF FATTY STOOLS IN THE DIAGNOSIS OF PANCREATIC DISEASE.

The general clinical teaching concerning this matter is an instance of the not uncommon but unfortunate persistence of a belief far beyond the time when it has been proved that it is incorrect. Since Claude Bernard first stated that he had shown that the secretion of the pancreas splits fats, produces an emulsion of the same, and causes absorption of the fats, it has been customary in works on clinical medicine and clinical diagnosis to state, with a strange degree of absoluteness, that the presence of an excessive amount of fat in the stools is strong proof of the existence of pancreatic disease. Indeed, in a number of books one finds the curiously inaccurate statement that "the presence of fat in the stools" indicates disease of the pancreas. By this the authors must, of course, mean large amounts of fat, as it is well known that every normal stool contains some fat, and the expression is, therefore, merely

an inaccuracy in statement; but it is an unfortunate inaccuracy, for most students and many practitioners seem full of the belief that the presence of fat in the stools, whatever the amount, means disease of the pancreas. The question under consideration, however, really concerns the value of very fatty stools in the diagnosis of pancreatic disease.

Let me first quote the conclusions which Oser reaches after a consideration of the literature upon this point. His first conclusion is that steatorrhœa, as such, gives no justification for the recognition of disease of the pancreas. The second is that *if there is no icterus and no apparent disease of the intestine it is possible* that disturbed fat digestion is caused by pancreatic disease. Third, the probability that disease of the pancreas is present becomes more marked and can even approach certainty if, in the absence of icterus, steatorrhœa exists with other symptoms which point toward disease of the pancreas. Such symptoms are chiefly imperfect absorption of protein food, diabetes, or a tumor in the region of the pancreas. Fourth, imperfect absorption of the fat and coincident diabetes may be found in the entire absence of disease of the pancreas. Fifth, it is uncertain in how far disturbance of the normal splitting of fats may be looked upon as a pathognomonic symptom of disease of the pancreas. Fat splitting is undoubtedly a function of the pancreas, and Müller's cases indicate very positively that disturbance of fat splitting is a strong sign of pancreatic disease; but this question has not been sufficiently studied, and a positive conclusion cannot yet be reached.

In spite of the fact that Hartsen in animal experiments seemed to show that extirpation of the pancreas caused marked disturbance of the fat absorption and thereby seemed to confirm Claude Bernard's results, there is a great deal of testimony that this does not necessarily occur even under such extreme conditions, though the most important observations—those of Minkowski and Abelman and of others who followed their methods—do seem to demonstrate positively that in animal experiments extirpation of the pancreas is followed by marked disturbance in the absorption of all fats except milk fats. It is not yet absolutely proved, however, that even extirpation of the pancreas has as a necessary result severe disturbance of fat absorption. The chief basis of the rather absolute teaching of clinicians seems to be the fairly frequent observation of the presence of fatty stools in cases which are, clinically, believed to be disease of the pancreas. The diagnosis of disease of the pancreas is, however, so insecure that it is surprising that clinicians have been so wedded to mere isolated observations without engaging in more careful study of the literature concerning experimental work and that concerning the conditions found in human subjects who showed other affections than disease of the pancreas. It is now fourteen years since a very important contribution by F. Müller showed very conclu-

sively that icterus of itself, unassociated with pancreatic disease but, of course, associated with absence of bile from the intestine, was accompanied by the passage of extremely fatty stools. In spite of the long period since this work was published, it is rather astonishing to see perpetuated in many of the most important works on general medicine and clinical diagnosis as well as in many special treatises on diseases of the pancreas the unvarnished statement that fatty stools are indicative of pancreatic disease. The most important fact which shows this teaching to be erroneous is that Müller's work and that of other observers, Walters especially, has demonstrated definitely that fatty stools can be seen in most cases of icterus in which the pancreas is entirely uninvolved. This had also been thoroughly demonstrated years before in experimental work on animals. But it must also be remembered that Müller showed, and his work has been confirmed by other observers, that severe disease of the intestine causes such pronounced disturbance of fat absorption as to give rise to the passage of stools that are very largely composed of fat.

The one observation which I have to report in this connection relates to the importance of icterus in the production of fatty stools. The second case to which I referred in discussing the sulphates was put upon a diet consisting solely of milk. The fat of the milk was estimated daily by the Leffmanu-Beau method, the stools were marked off by ehareol, and three days' stools were collected, a strong solution of corrosive sublimate being added to prevent continued bacterial activity. The stools were evaporated to dryness. As they came to me the stools were completely acholic in appearance; they had a pale, grayish-yellow color, appeared to be composed chiefly of fat, and were extremely pasty and oily in consistency. After evaporation to dryness it was evident that they were composed almost entirely of fat, for even when the water was completely driven off moderate heating on a water-bath caused the whole mass to become completely fluid and to assume the appearance of oil. Upon cooling the stools became solid, but even when cold the consistency was much like that of a mass of pure fat. The total amount of dried feces in the three days was 184.69 grammes. Of this 154.18 grammes were shown by complete ether extraction in the Soxhlet apparatus to consist of fat. Hence of the total amount of dried feces 83.48 per cent. was fat. The patient during the three days ingested 250.8 grammes of fat, and the total amount of fat in the feces was 154.18 grammes. She absorbed, therefore, only 61.6 per cent. of the fat ingested, while normally as much as 90 per cent. is usually absorbed. This patient, as will be remembered, became entirely well soon after this observation was made, and it may therefore be stated, I think, that there was no pancreatic disease. There was, however, pronounced icterus, and it is almost unquestionable that the icterus alone caused the

marked disturbance of fat absorption. This is only a single contribution to the work to which I particularly referred—that of Müller, in which he showed clearly that icterus causes profound disturbance of absorption of fats—but it serves to add emphasis to the statement quoted that poor fat absorption is of itself of no importance in the diagnosis of pancreatic disease if icterus is present; and in carcinoma—the most common disease of the pancreas—icterus is so frequently present as to make such a statement one of great importance.

The last of Oser's conclusions, to which I referred earlier, relates to the observation made by Müller that while the fat absorption is greatly disturbed by absence of bile from the intestine, the splitting of the fats is normal in this condition, but is much reduced in pancreatic disease. As stated by Oser, there have been few studies of this question excepting those made by Müller himself. v. Noorden obtained results similar to Müller's in two cases of pancreatic disease. Northrup and Herter, in the case which has previously been referred to, investigated the splitting of the fats with negative results, the fat digestion being normal; but, as they state, negative observations do not invalidate Müller's teaching. It is quite possible that the intestinal bacteria may exercise sufficient fat-splitting action to make a negative result in such an investigation of no value. It is also quite possible, I think, as I said before in speaking of the sulphates, that the pancreatic duct at the time of examination may have been open or only incompletely closed; pancreatic secretion may have been produced to some extent, and the secretion may have partly or wholly escaped into the intestine, thus making the result negative.

It seems probable that a negative result of this test also would not be of much value, for such a result would be subject to about the same considerations that I have suggested in speaking of the ethereal sulphates. A positive result, however, so far as our knowledge now goes, would seem to be an indication of pancreatic disease if diarrhoea were absent, for I am not aware that marked disturbance of the fat-splitting action has been observed in any case in which it was known that pancreatic disease was absent, excepting when severe intestinal disturbance was evidently present.

In the case of prolonged catarrhal jaundice in which I studied the fat absorption I also investigated the amount of fat splitting that had taken place; 78 per cent. of the large amount of fats that was present in the feces was fatty acids and soaps, only 22 per cent. being found as neutral fat. These conditions are entirely normal, and hence the case also serves to add some weight to Müller's statement that icterus, while largely interfering with fat absorption, does not disturb the splitting of the fats. In the case of pancreatic carcinoma a study of the digestion of the fats would have been more directly of diagnostic

interest. Unfortunately, such a study could not be carried out, because the stools were not preserved owing to confusion resulting from a change of ward nurses.

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PREMATURE INFANTS.

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I HAVE selected the subject of premature infants because it has been inadvertently neglected. The theme is far from hackneyed; and as I have had unusual facilities for observing this class of patients at the Nursery and Child's Hospital of this city, it is hoped the subject may be of interest. Records of forty cases are in my possession, of which a large majority have come under my observation clinically or on the autopsy table.

On examining a premature infant we are impressed with its general diminutive characteristics, with which the excessively developed head ill corresponds. The skin is a raw, cinnamon-red, and presents lanugo in proportion to the period of prematurity, while the lack of subcutaneous fat gives the skin a wrinkled appearance and the face an expression of senility. The greater the period of prematurity the more marked the torpor and inactivity of the child. The limbs evince little motion, and the occasional feeble whine contrasts strongly with the cry

of the healthful full-term infant. During the first days the eyes are constantly closed, and the child passes its time in torpid somnolence, never displaying even the wandering stare that a full-term infant shows through its half-open lids.

The nails are soft and do not reach the ends of the digits; this is even more noticeable on the toes. The wide-open fontanelles and sutures give a yielding character to the cranial vault, and the bones are so soft and pliable that the symmetry of the skull is easily destroyed by pressure. If temporary, the bones quickly resume their proper relations; but if by lying in one position, as is often the case, the weight of the head falls continuously upon one side, a marked deformity develops.

Even a full-term infant experiences a contrast during its first days of independent existence, and begins a struggle which ill suits the lazy habits acquired in utero; unceremoniously forced from its parasitic life, it is now compelled to do its own work and earn its own livelihood. During the first days of the struggle for existence many succumb to the novel conditions.

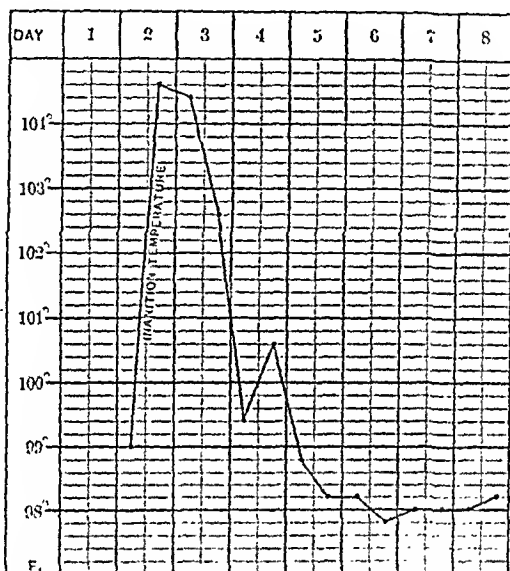
If hard upon the full-term infant, how much more difficult the effort for the prematurely born, all too soon thrust into an unsuitable environment where each undeveloped organ must be subjected to an unaccustomed strain. As if in protest, the vigorous infant sets up a howl, but the weak lungs of the premature can but feebly whine a denunciation of the entire process. Thus begins a series of respiratory gymnastics which must be independently maintained through life.

The greatest task undertaken by the premature infant is the maintenance of its body heat. In utero this is passively received from and governed by the mother, but at birth the infant passes from the uniform temperature of the amniotic fluid to the lower and variable temperature of the air. From this time the uneducated heat centre struggles to so control the manufacture and loss of heat that a normal temperature may be maintained.

The last chart (V) shows the temperature of an infant born at the twenty-ninth week. Its birth-weight was only three pounds. For nine days the temperature remained subnormal. This may have been due to a lack of vitality which did not permit of proper heat production, or, what is more likely, to an excessive heat loss. It is a well-known physiological fact that the smaller the individual the greater is the proportion of body surface exposed for radiation, and consequently premature infants are compelled from their diminutive size to manufacture a greater proportional amount of heat. Unjust as it seems, then, the smaller and more premature the infant the greater is the task imposed. It is hardly to be expected that the uneducated heat centre can be forced to that nicety of control which exists after the mature training of adult life.

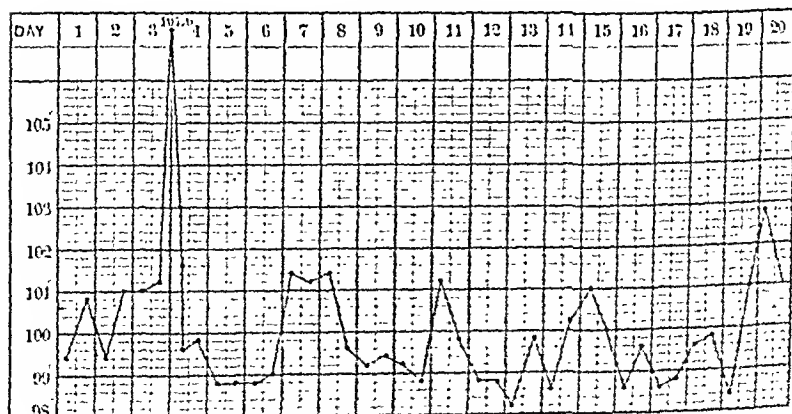
In the premature infant it is especially erratic during the first days of life. The infant may maintain a high range of temperature, in which case the fuel of the body is unnecessarily consumed and the constitution weakened; or the temperature may remain subnormal, this being an index that the vitality of the child is low and death may be impending. More frequently the temperature runs an up-and-down course, at times high and at times low, and days may elapse before the normal is

CHART I.



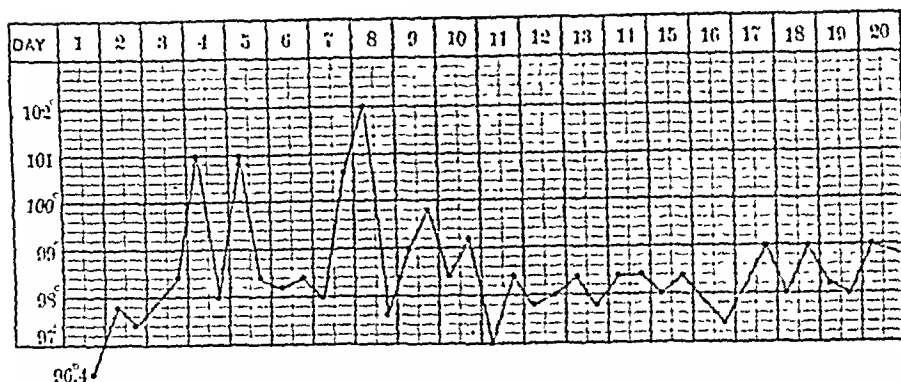
Inanition temperature. Infant born at thirty-fifth week.

CHART II.



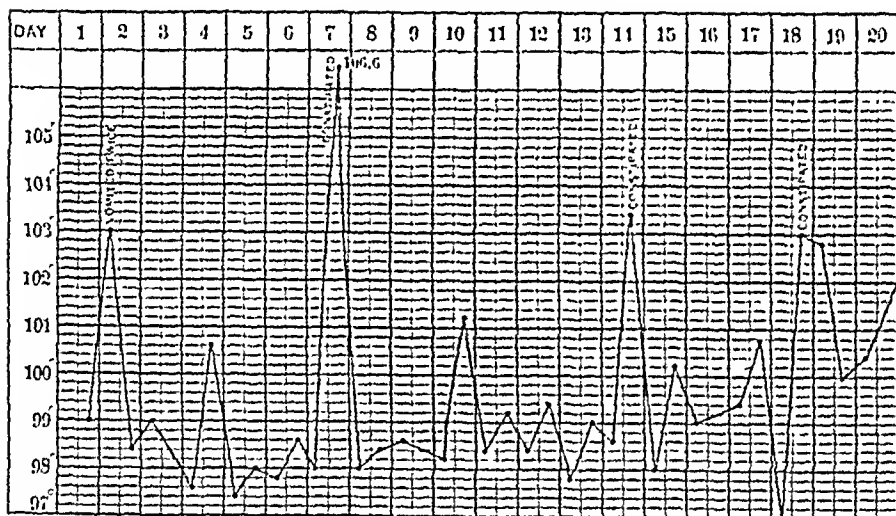
Born at thirty-fifth week. Irregularity of temperature unaccounted for except by prematurity of infant.

CHART III.



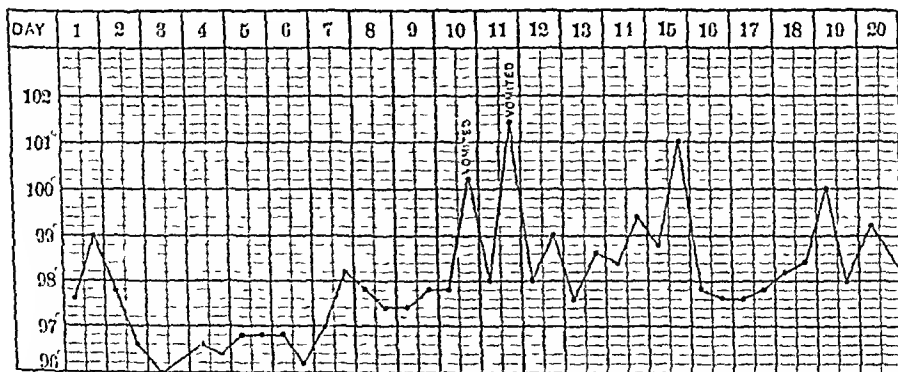
Very small premature infant. Born at thirty-fourth week. Irregularities of temperature due to prematurity and constipation.

CHART IV.



Born at thirtieth week. Temperature irregular. The smaller variations due to period of prematurity and the larger to gastro-intestinal symptoms.

CHART V.



Born at twenty-ninth week. Birth weight 1480 grammes (3 pounds). Temperature subnormal till the tenth day. Had repeated attacks of cyanosis.

approximated. An irregular temperature may be considered quite the normal, and no further cause need be assigned than the prematurity of the infant.

Secondly, changes in temperature may be due to gastro-intestinal symptoms, to which these infants are particularly prone. Constipation, looseness of the bowels, and attacks of vomiting frequently cause a sharp rise in temperature. An overheated incubator may cause a miniature heat prostration, which, fortunately, needs no more active treatment than a more careful regulation of the heat supply.

In order to understand the irregularities of respiration it is necessary to study the embryology and pathology of the lung. During foetal life no alveoli exist prior to the fourth month, and the bronchial tubes are widely separated by mesenchyma. As the lungs develop the ramifications of the tubes extend rapidly. In the prematurely born the alveoli are surrounded by an excessive amount of connective tissue and are poorly developed, so that they contrast strongly with the superabundant bronchi. The vascular structure of the lungs is composed of a rich, unsupported capillary network whose elastic walls are easily overdistended and led to encroach upon the air vesicles. The feeble respiration permits of collapse of the air vesicles and engorgement of the vessels, resulting in hypostasis and atelectasis of the posterior and dependent lobes. Autopsies upon this class of patients in the first days of life seldom reveal completely aerated lung, patches of atelectasis being seen in a greater or less degree.

The bony framework of the thorax is non-resistant and elastic, so that during forced inspiration the chest-wall sinks in. With such an ill adapted chest-wall and poorly developed lungs the gasps of the infant are disappointingly ineffective.

After it is first established the respiratory centre is unstable and the action of the lungs irregular. A respiratory rhythm resembling the Cheyne-Stokes is frequently seen. The primary respirations are apt to be delayed or so feeble as to require treatment. Even after being first stimulated to its task the respiratory centre may fail and an attack of cyanosis ensue. In adult life such a plight would automatically stimulate the respiratory centre to action, but under these conditions prompt treatment must relieve the dyspnoea, or the helpless infant may gasp in vain. One attack of cyanosis is apt to be followed by another, each becoming more urgent, until at last death ensues. This is one of the most frequent terminations of the prematurely born.

Of the 40 cases of which I have records 11 had cyanotic attacks, causing 4 deaths; while 2 others died of cyanosis and complicating symptoms. That the liability to these attacks is increased by the period of prematurity is seen by the fact that six of the cases

occurred in children born in the twenty-eighth, twenty-ninth, and thirtieth weeks, while only five are recorded thereafter. They are also peculiar to the first days of life, and in the series under consideration no deaths were caused by them after the tenth day of life.

The ductus arteriosus and foramen ovale appeared to have no part in these attacks of cyanosis, for both post-mortem and clinical evidence demonstrated a closure of these structures.

The independent maintenance of a regular temperature and respiratory action is not attempted until after birth, but the heart in utero has had preliminary education, and its action is consequently more regular than that of respiration. Still, it is not as machine-like as when experienced in its task, and occasionally falters. In fact, death may ensue from simple cardiac failure. In the records in my possession four died from no assignable cause. The machinery refused to work, and in this breakdown the heart probably played a part.

The kidneys, like the other vital organs, may balk in their duty; often a day goes by without any urine being passed, and occasionally it is longer delayed. Uric acid is secreted in abundance, as evidenced by the frequent pink stain upon the napkins, and inspection of the kidneys reveals fan-shaped infarctions of uric acid in the pyramids.

Another frequent symptom of prematurity is a general œdema. It is difficult to say to what this is due. It may be the feeble heart, the balking kidneys, or the anemia of the infant.

Premature infants possess at birth an excessive amount of hæmoglobin, but it appears to be loosely bound in the red corpuscle, and there is a decided tendency to the development of an anæmic state. Ofttimes we are impressed with the waxy whiteness of the occupant of the incubator; this is simply an exaggeration of the loss of hæmoglobin which occurs during the first three weeks of a full-term infant's life. Destruction of hæmoglobin is active in both cases, but, as in other constructive processes, the organism of the premature is tardy in fulfilling its duty.

The weight of the child is the best guide we have as to its condition, and its birth-weight is an index to its vitality. The premature weighs less and gains more slowly than the full-term infants, but the slight variations in weight are all-important, and it is not until there is a steady gain that proper progress is assured, and, on the other hand, a steady loss is threatening. A normal full-term infant loses weight for three days, and then makes steady gains until the birth-weight is regained by the tenth day. In the premature the constructive processes are slower, and the average of the cases under consideration do not show the birth-weight regained until the thirty-first day. The more premature the infant the slower the process of tissue formation, and months may elapse before the Liliputian characteristics are lost.

MORTALITY ACCORDING TO PERIOD OF PREMATUREITY.

Period of Prematurity.	Diseases of Prematurity (died).	Diseases of later life (died).	Discharged.	In hospital.
28 weeks	5			
29 " . . . . .	...	1		
30 "	4	2		
31 " . . . . .	...	1		
32 "	1	...	1	
33 "	1	...	1	
34 " . . . . .	...	1	1	
35 " . . . . .	...	2	5	
36 "	2	...	2	
37 " . . . . .	...	4	1	3
38 " . . . . .	...	...	2	
	13	11	13	3

Of the 40 cases reported 16 were discharged or are still inmates of the Nursery and Child's Hospital, while 24 died. All the children born in the twenty-eighth week succumbed in a few hours or days. One born in the twenty-ninth week was making good gains and doing nicely, when he contracted measles at nine months of age and died of a complicating pneumonia. It is unfortunate that so many cases like this terminated in death due simply to extraneous causes, and not attributable to prematurity. This fact has made an unwarranted increase in the death-rate. Of the 24 deaths 11 are attributable to the infantile diseases of later life, none of these dying until the period of full term was passed. Measles and pneumonia killed 2, pneumonia 1, while marasmus caused 7 deaths. None of these children died until after they had passed the nine months of uterine life, consequently cannot be said to have died of prematurity *per se*. Their deaths can be ascribed to the usual conditions which threaten the life of any infant in an institution; still the large death-rate from malnutrition naturally suggests a predisposition to an unbalanced nutrition. The patients did remarkably well as long as mother's milk could be obtained, but the death-rate was increased by the scarcity of the supply. This compelled the administration of a substitute feeding as soon as the critical days were past. Artificial feeding, together with the unhygienic conditions of institution life, were large factors in the death-rate.

CAUSES OF DEATH.

No evident cause	1
Hemorrhages	2
Cyanosis	4
Cyanosis and hemorrhages	1
Anæmia	1
Anæmia and catarrhal colitis	1
Anasarca and cyanosis	1
Malnutrition	7
Gastro enteritis	1
Measles and pneumonia	2
	<u>21</u>

Thirteen died of the diseases peculiar to prematurity: of these, cyanosis killed four. Three deaths are recorded from cyanotic attacks during the first four days and only one as late as the tenth. Autopsies in these cases showed the condition was due to atelectasis of the lungs. Four cases died of no assignable cause. Although these cannot be safely classified as due to heart-failure, no doubt disturbance of that organ was a determining factor. Two deaths were caused by hemorrhage pure and simple. Autopsy in one of these cases showed large clots in the lateral ventricles, while in the other the hemorrhage was located in the suprarenal capsules and broke, forming a large retro-peritoneal clot. One infant died of a combination of cyanosis and hemorrhages; blood was passed from the mouth, nose, vagina, and rectum.

In one case a marked anemia appeared to be the only cause of death. A general edema, combined with cyanosis, killed one. It is a common observation that premature infants show little resistance to infection, and without proper precautions may die of sepsis. Fortunately, in the present series no deaths are recognized from that cause.

PROGNOSIS. The more premature the infant the more hazardous the outlook. Few infants born before the twenty-ninth week are saved. The temperature has no prognostic value.

Attacks of cyanosis are not necessarily fatal, and if the infant withstands them during the first few days the case becomes more hopeful, the attacks gradually diminishing in significance as time goes on.

Continued loss of weight is discouraging, and the sooner a steady gain in weight is recorded the better. Some time must elapse before the nutritive processes have developed a healthy body; but once well started the extra-uterine growth of the child should be healthy, although perchance tardy. A tendency toward malnutrition, however, should be guarded against.

TREATMENT. Some premature infants demand no more treatment than those born at full term, and of this class it is hardly necessary to speak. Let us rather confine our attention to those whose demands are the most exacting.

The proper treatment of the premature infant requires excessive attention to details. We are apt to consider an incubator the one and only requisite; but while it is quite necessary, it is vain to place reliance upon it to the neglect of the exacting duties of everyday life. The premature infant demands as nearly as possible the conditions experienced in utero, and every effort must be made to simulate this environment. The child in utero rests in a warm chamber, bathed, as we may say, on every side by a water bed, while the body-wall of the mother shields it from external violence. No ray of light or sound from the external world disturbs its delightful slumber. These condi-

tions we must strive to simulate artificially, and the incubator must be dark and quiet, while the temperature is carefully regulated. It is not essential to discuss the mechanics of the incubator, which are described in various text-books. It is only necessary to say that the temperature should be controlled to meet the various conditions. If the infant is very puny and in an early stage of prematurity the temperature of the incubator must be high at the onset; 95° F. is well tolerated in these cases. It is exceptional for as high temperature as this to be required for any length of time. In the ordinary case 90° F. is high enough. A temperature-chart recording a continued low range indicates that the heat-producing power of the infant must be artificially aided, while a state of fever may better be controlled if the temperature of the incubator is reduced.

Only careful watching can satisfactorily accomplish our object. Often the patient's temperature is abnormally increased by the excessive heat of the incubator, but promptly falls when this is properly regulated by the nurse.

A high temperature should be gradually reduced as the vitality and animal heat of the patient indicate, but the incubator will at least be required until the child has reached an age corresponding to full term, and in many cases longer.

During incubator life the reduction in temperature must be gradual until it corresponds to that of the open room, and the child is by degrees educated to existence outside the incubator.

It is useless to lay down arbitrary rules for the temperature of the incubator. It is only by close observation and good sense that it can be properly regulated.

If possible it would be better to forbid any disturbance of the infant whatever, but attention to the toilet demands a certain amount of handling. Fondling and unnecessary handling strain the heart and cause unaccustomed sensations, which are more deleterious than ordinarily appreciated. They should be strictly forbidden. Baths are to be prohibited for several days, and if the buttocks are soiled the necessary cleansing can be accomplished with a bit of moist absorbent cotton. Even the napkin is easily dispensed with and its place taken by a bit of soft cotton, which absorbs the urine and receives the feces. This can be replaced without disturbing the infant.

The simpler the clothing and the fewer the pins and fastenings the better. Our ideal is well realized in a shirt which opens down the entire front and is long enough to completely cover the feet. This should be made of an inexpensive material, so that it can be destroyed when soiled, and should be so soft that it will not irritate the sensitive skin. No material suits the purpose better than cotton sewed between two layers of fine cheese-cloth. Wrapped in this, the infant should repose on the

softest possible couch, and only be disturbed for feedings or changes in the toilet.

Without daily weighing it is difficult to judge of the infant's progress, but in most cases it had better be dispensed with and the observer content himself with a record of the weight at infrequent intervals.

The attacks of cyanosis are serious, and each attack should be promptly treated by the administration of oxygen and minute doses of whiskey. This symptom frequently appears after taking food, and if any of the milk has found its way into the larynx and trachea it should be promptly removed by inversion of the infant and by patting the back. Distention of the stomach, by pressure on the lung tissue, may cause cyanosis; distention of the bowels may also embarrass respiration. In fact, the intestines demand the closest attention, as their action is sluggish. The entire muscular system, whether voluntary or involuntary, is poorly developed, allowing of nothing but feeble movements and apparent torpor. The muscle of the intestines permits of a stagnation of the feces, which must be urged onward by small doses of castor oil. Attention to this apparently insignificant function may keep the vitality of the infant from danger. The abdominal wall is non-resistant, so that hernia easily force their way through in a goodly number of cases, giving conspicuous evidence of a lack of muscular tone.

The stomach of the premature is very small, and whereas a full-term infant's stomach has a capacity of an ounce, the premature must be fed in fractions of that amount. The smallest of this class of patients take but a drachm at a feeding, while the more robust can take two or three drachms or more at the beginning.

Although but small amounts are tolerated, the fuel should be frequently administered to maintain the body heat. The intervals of feeding should be hourly at first, and gradually increased by a quarter of an hour at a time until the quantity and frequency of the feeding approach that indicated in a full-term child.

The torpor and weakness of the premature during the first days of life often prevent the instinct of nursing. In such a case the infant must be fed. The milk is best offered in a medicine dropper, a few drops at a time; it readily runs back into the fauces and is swallowed. As the constitution becomes stronger the infant can be taught to nurse from the bottle, and later it can be taken from the incubator or put to the breast.

Gavage, highly recommended by some authorities, appears to disturb the infant too much, and it has not been found necessary in the cases reported. Certainly it should be avoided if simpler means are adequate.

The importance of proper feeding in cases of prematurity cannot be too strongly accentuated, more deaths resulting from ignorance of this subject than any other one item. In the first place, the gastro-intestinal

tract is so poorly developed that fats and proteids are feebly digested. If a modified milk is administered it must be weak, not containing more than 1 per cent. of fat and 50 per cent. of proteids, until the alimentary tract is educated to its task. Modified milk is warmly recommended by Rotch, of Boston, but our experience indicates that it should not be used when proper breast milk is obtainable.

Mother's milk is the ideal food, and every premature infant should have it if its variations and management are properly understood. In order to explain the subject attention is called to the analyses made by my brother, John S. Adriance, Ph.D. In co-operation with him the author published in the *Archives of Pediatrics* of February and March, 1897, an extended article on the chemistry of human milk. It was demonstrated that there are peculiarities during certain periods of lactation. During the first few days, when the breasts are assuming their activity, there are irregularities which do not occur when the function is established. Normal colostrum—that is, milk during the first few days after a full-term labor—shows a wide variation in the amount of fat. The sugar is low at first, but increases rapidly, and by the end of the first two weeks has made a marked increase. The proteids pursue just the opposite course, being higher on the second day than at any other time during lactation, but falling rapidly during the first few days, and less rapidly thereafter.

This excess of proteids in colostrum milk is due to the sudden assumption of the mammary function. The breasts are unexpectedly engorged with an increased blood-supply and the mammary cells forced to activity. It is no marvel that during this strain the secreting cells permit of a serous transudation and that an excess of albumin is found in the secretion.

The milk offered by the breasts during the first days after a premature labor is colostrum milk and has its characteristics, but to an exaggerated degree. The marked increase in the amount of proteids is especially noticeable. The excess persists longer, and it is not easily dispelled. It has even been found persisting as high as 2 per cent. in the second month.

ANALYSIS OF PREMATURE MILK AT SUCCESSIVE TIMES.

	4 days.	17 days.	1 mo. 10 days.
Fat	3.32	3.32	3.53
Carbohydrates	3.02	4.43	6.64
Proteids	4.90	3.88	1.71
Salts	0.31	0.26	0.10
Total solids	13.66	11.91	11.79
Water	86.32	88.08	88.20

These analyses demonstrate an excessively high percentage of proteids, accompanied by a correspondingly high percentage of salts. They

decrease together as lactation progresses. The amount of carbohydrates is lower than in any other series of milk analyzed. The last two factors hardly require attention, but the excessive proteids should be recognized.

The management of this condition is difficult; while ordinary colostrum milk soon adjusts itself, the milk of prematurity persistently maintains a high percentage of proteids. It may be reduced by administering large quantities of water to the mother or by pumping the milk and diluting with milk-sugar solution. Exercise, upon which we ordinarily rely for diminishing the proteids, is out of the question during the period of childbed.

Even if our efforts were successful the milk presents different characteristics from that later in lactation, and cannot be administered in safety. Many premature infants could be saved if this were generally known and the gastro-intestinal functions guarded with the care they demand. Attacks of vomiting and looseness of the bowels, with curdy movements, may seem trifling, but they are unwarranted in these delicate patients, especially when it is realized that a toxic gastro-enteritis with high temperature and fatal issue may ensue.

In cases of prematurity, then, the mother's milk should not be offered, but a wet-nurse secured. Her infant must be healthy, full term, two weeks of age (and, better, a month), in order that the characters of the colostrum period may be lost, and nothing will better determine the quality of her milk than its chemical examination.

The mother's breasts in the meantime should be pumped and massaged, so that they will not dry up, but after the proper change in function will offer the proper food. The change from wet-nurse to mother, however, must be gradually and carefully managed.

To summarize feeding in this condition, our indication is to administer a weak, digestible food, guarding against overtaxing the stomach and intestines. These organs must be protected, even if temporarily the nutrition of the infant appears to suffer, their future education being relied upon to take care of a stronger diet.

A CONTRIBUTION TO THE STUDY OF FATTY INFILTRATION OF THE HEART SECONDARY TO "SUBPERICARDIAL OVER-FATNESS."

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In this paper it is intended to consider, principally, questions relating to fatty infiltration of the heart as met with in extreme obesity. I desire also to note briefly the more distinctive symptoms of pure fatty overgrowth (fat around the heart). This will, it is hoped, assist in the dis-

crimination of the cases in which fatty infiltration is superadded. A certain small proportion of the cases of fatty infiltration are associated with graver forms of myocardial degeneration, principally fibroid and fatty. As the result of considerable personal experience with cases of fatty overgrowth and fatty infiltration the belief that fatty degeneration is a rare sequel of the latter condition is amply confirmed. The view that "fatty deposits in and around the heart often cannot be distinguished from fatty degeneration," however, is incontrovertible. Conversely, I have met instances that presented undoubted evidences of "subpericardial over-fatness" combined with features that aroused suspicion of fatty infiltration and degeneration, in which, after the over-fatness was removed, the heart-sounds became of normal strength and clearness, the features pointing to myocardial involvement disappearing.

According to E. Leyden,² the cases of "fat-heart" are divisible into two subclasses: (a) fatty overgrowth and (b) fatty infiltration. By the former term is meant an excessive deposit upon and around the heart in the subpericardial space; the latter (fatty infiltration) refers to an infiltration or a dipping of fat between the muscle-fibres even to the endocardium. While accepting this general classification, which is both convenient and expressive from a clinical stand-point, I would suggest for the first subclass the term "subpericardial over-fatness," since all cases present clear evidences of general over-fatness, rarely of partial over-fatness, and there is slight, if any, implication of the myocardium in most instances. On the other hand, the form of fatty infiltration under consideration is clearly a rare condition, if we accept the not uncommon instances hinted at above in which the morbid process is limited to a thin layer of muscle-fibres situated directly beneath the epicardium, and one met in extreme obesity, as a rule. When the infiltration is confined to the superficial muscular bundles it is more than doubtful if the characteristic symptoms of fatty infiltration arise. Clinically, it is important to make a clear subdivision of "fat-heart" into two classes: the one, a large class, easy of recognition, in which there is an abnormally large deposit of fat beneath the epicardium; the other, a small group, not easily recognized, in which intersubricular fat deposits occur, and of graver significance. It is with the view to the adoption of a term that is more nearly distinctive of the condition, both as to the position as well as the significance of the fat-deposit, that I venture to suggest "subpericardial over-fatness" to indicate the more common and less serious form of "fat-heart."

Fatty overgrowth was described by a few of the earlier writers.

¹ Schott. *British Medical Journal*, August 18, 1891.

² Berlin. *Mün. Wochenschrift*, April 22, 1878.

among them Kirkcringins and Bonet.¹ Nothing of importance, however, was added to our accurate knowledge of the subject prior to the middle of the present century. Moreover, it has attracted a remarkably small share of attention since that epoch-making period in myocardial affections.² Mere obesity (subpericardial fatness) does not imply fatty infiltration; but it may in a mechanical manner produce respiratory and circulatory disturbances, particularly venous stasis, as shown by cyanosis, a frequent, small pulse and dyspnea, or a distinctly asthmatic form of breathing and sometimes cough. These symptoms are commonly provoked by undue muscular exercise, which readily induces heart-strain and embarrassment of the respirations in the obese. From the continuation of the operation of such influences, as in certain occupations, venous stasis may lead to so-called passive catarrh of the mucous membranes. Certain bronchial and gastric phenomenon with which we are acquainted now ensue. In subpericardial over-fatness the heart's weight and labor are obviously increased. The poisonous products of tissue-metabolism are not eliminated in the normal ratio. Indeed, in one of my cases, a female, aged forty-two years, presenting marked obesity, weight 225 pounds, the daily renal output was diminished one-half from the normal health standard. The amount of food ingested even under these circumstances was plus, and the case exhibited all of the typical phenomena of lithæmia, of which the obesity was probably the cause. Doubtless the degeneration (fatty) of the myocardium that is sometimes witnessed in long-standing cases is secondary to the changes that often occur in the vascular system (arterio-sclerosis). It is conceivable also that, owing to the mechanical obstruction to the cardiac movements in consequence of the presence of a copious deposit of fat in the mediastinum and beneath the epicardium, the heart action may be totally and suddenly arrested as the result of violent exertion.

Morgagni³ narrates a case of a corpulent man, aged fifty-eight years, who had been suffering three years prior to death from attacks of angina pectoris. The autopsy revealed a large deposit of fat in the mediastinum and subpericardial areas. The heart was of normal size and apparently quite sound. He expressed the opinion that the cause of death was the enormous fat deposit which obstructed the current of blood in the heart and lungs. No mention, however, is made of the condition of the coronary vessels.

In two cases of subpericardial over-fatness, one reported by R. G. Hebb and the other by Hingston Fox, sudden death occurred. One

¹ Quoted by Alfred Stengel, Philadelphia Medical Journal, October 13, 1900.

² For the historical development of the subject the reader is referred to the excellent article of F. Forchheimer, M.D., AMERICAN JOURNAL OF THE MEDICAL SCIENCES, December, 1888.

³ Cor adipeplane tectum.

of these patients fell dead while running to catch a "bus;" the other, five minutes after being anesthetized. In both instances, however, rupture of the left ventricle was noted at autopsy. Hingston Fox's case, "from staining reactions of the muscle-fibres and their striations," showed no indication of either fatty degeneration or fatty infiltration of the heart-wall. In Hebb's case "fatty degeneration was absent." Such facts as these go to show that subpericardial over-fatness, looked upon usually as being free from immediate danger to life, may possess considerable medico-legal importance. Among the inevitable secondary effects occasioned by this interference of general fatty overgrowth with the heart mechanism and lung expansion are certain nutritive disturbances, the extent of which it is impossible to estimate with any degree of accuracy. Ordinarily, while at rest, the pulse is regular and moderately strong, although hard to reach in some cases. In the plethoric form of obesity, notwithstanding the presence of greatly thickened chest-walls, the great strength of the cardiac systole is often surprising, while the pulse is full and regular. On the other hand, particularly in the anæmic variety of obesity, it may be small, less tense (compressible), and slightly increased in frequency, but, as a rule, regular. A moderate grade of cardiac hypertrophy due to an increased demand upon the contractile energy of the heart is sometimes observed, but in many instances it is not found present. Says Kennedy,¹ *cardiac hypertrophy* (italics mine) "is not to be wondered at, for it would be strange indeed if, with an addition of from three to six ounces of fat placed on the organ, it would continue to carry on the same degree of action as in the normal state." It is often impossible to determine the size of the organ during life, owing to the overlying fat deposit. Enlargement is more common, for obvious reasons, in cases in which dilatation ensues in consequence of fatty infiltration. Not a few of the subjects of subpericardial over-fatness lead active, useful, and energetic lives.

It is impossible in the present state of knowledge to establish precisely the relation of this condition to fatty infiltration and myocardial degeneration, either fibroid or fatty. There is probably little convincing evidence to support the current view that subpericardial over-fatness is commonly, or even in any considerable percentage of cases, followed by fatty infiltration. According to my observation, without exception fatty infiltration was secondary to the pronounced form of anæmic obesity. Out of 103 cases, lasting for periods ranging from a few to many years, of extreme polysarcia that have occurred in my experience only five cases gave convincing proof of the existence of fatty infiltration. It has been reported, though rarely, in moderately corpulent

¹ *Observations on Fatty Heart*; Gray, 1900.

persons; but in such the symptoms are probably dependent upon a true fatty change due to causes other than fatty infiltration. It is in these cases that the renal output is markedly deficient. Again, the question how long subpericardial over-fatness continues as such before it terminates in fatty infiltration, in cases in which this sequel occurs, is unknown; but the usual period must, from personal knowledge, be measured by decades and not by years.

Rarely, however, we meet with exceptions to the rule. The clinical indications of fatty infiltration then appear early, and an alarming condition may soon be presented. The advisability and even the clinical importance of clearly differentiating mediastinal and extra-cardiac conditions from those that distinctly impair its contractile power, as, for example, fatty infiltration, must be obvious. In most instances, at least, the process of fatty infiltration reaches its highest development in the right ventricle, which in marked polysarcia may be completely covered by the deposit of fat, the left being rarely completely enveloped. The interfibrillar depositions are most marked near the surface of the organ. Fat infiltration exerts pressure upon and between the muscular fasciculi, inducing "atrophy and replacement" and embarrassing the action of the heart. This form of atrophy is secondary to and dependent upon the infiltration; but "some cases of primary atrophy of the muscle lead to the secondary development of fat in the connective tissue which is everywhere present and potentially fat-bearing."¹

A similar mode of origin of fatty infiltration is also exemplified in cases of pericarditis followed by adhesion of the visceral and parietal surfaces of the pericardium. It is conceivable that, as the result of mechanical compression by fat, the lumen of the coronary vessels is narrowed, with consequential defective nutritive supply to the muscle cells. Under these circumstances fatty metamorphosis or degeneration is the result, but this is probably an exceptional sequel.

In the cachexias of carcinoma and phthisis, as well as in the general senile atrophy, a moderate degree of subpericardial over-fatness, fatty infiltration, and true fatty change may all be found in association. In such instances the fatty infiltration may be, in part at least, secondary to atrophy of the muscle cells (part of a general atrophic process), and not the cause of the metamorphosis. At all events it may be assumed that it is only in the extreme grades of fatty infiltration that muscular atrophy from compression by infiltrated fat ("pressure atrophy") ensues.

I shall deal only with cases of fatty infiltration that are the consequence of extreme obesity combined with subpericardial over-fatness.

¹ R. Douglas Powell. *Allbutt's System*, vol. vi., 893, 894.

The etiology is obviously that of extreme general obesity, particularly the anæmic variety, however the latter may be produced. As a clinical entity, fatty infiltration is not sharply defined, and writers are not in perfect agreement as to the grouping of features on which to base even a reasonably assured diagnosis. Two conditions are among constant accompaniments, marked polysarcia and a feeble heart. It may be pointed out that in the majority of cases it is not until the symptoms of commencing dilatation, often as the result of sudden or unusual muscular exercise or a profound shock, develop that we are warranted in entertaining the belief that fatty infiltration has supervened. The more characteristic clinical indications are urgent dyspnea upon muscular exercise, præcordial discomfort, pain under the sternum, angina pectoris, cardiac palpitation, arrhythmia, syncope, vertigo, and cyanosis. Various forms and grades of intensity of cardiac arrhythmia are commonly present.

Slight irregularities in which the pulse-waves occasionally vary in size and tension, or an occasional intermittence followed by a brief pause, are not indicative of fatty infiltration; at all events, they are not unfavorable symptoms. I have repeatedly observed slight intermittence and arrhythmia disappear as the result of treatment directed to the over-fatness. On the other hand, marked and constant disturbance of the cardiac rhythm is symptomatic of fatty infiltration and irremovable, although marked improvement may follow an appropriate course of treatment. Kisch¹ pertinently remarks: "Complete irregularity, *delirium cordis*, is to be regarded as a sign of grave disturbance of the heart mechanism which can never be removed, and is sometimes premonitory of sudden death." Cardiac arrhythmia is not, however, peculiar to fatty infiltration. Moreover, there are latent instances in which the pulse is full and strong and not increased in frequency. In a strongly suspicious case under my care at present the pulse is large, regular, and of high tension. With the appearance of ensuing cardiac dilatation the pulse-tension falls and the frequency of the heart's action increases. Irregularity also supervenes. Thus the transition of the disease from the earlier to the later stages may be noted, and these changes that occur in the development of the disease may serve to explain the differences of opinion among clinical observers as to the rate and other peculiarities of the pulse.

Henry Kennedy² bases his diagnosis upon a large, full pulse, not increased in frequency, an enlarged area of heart dulness; possibly a soft, systolic murmur over the base.

Bronchial asthma or an asthmatic type of breathing after a full meal, or in the absence of any exciting cause, is frequently observed in fatty

¹ Berliner klinische Wochenschrift, March 18, 1895.

² Loc. cit.

infiltration. A passive (hydrostatic) bronchitis, with cough and expectoration, is superadded in most cases. Angina pectoris is a recognized symptom. From personal experience, the apprehension of arterial disease, particularly sclerosis of the coronaries, is warranted in the majority of the cases that exhibit angina pectoris. Again, in the tabulated list of cases appended below arterio-sclerosis was present in two of the three fatal instances, but no particular mention of the condition of the coronary arteries was made in the autopsy notes. It may be pointed out here that in none of my cases was aortic regurgitation or adherent pericardium (so far as could be determined) in association, but in two of the five cases reported there were evidences of arterio-sclerosis. In Case I., in which severe attacks of angina still occur, the vasomotor apparatus is greatly disturbed during the seizures. I have had an opportunity to examine this case immediately after the paroxysm. So soon as the pain is over gaseous eructations occur; the heart's action, which is at all times markedly irregular, is unchanged, although the pulse at the wrist becomes almost imperceptible for a short period and dyspnoea is also temporarily aggravated.

The above symptom-group includes the most characteristic features, while other and more unusual manifestations are pointed out in the notes of the subjoined cases. The more or less characteristic features of fatty infiltration may become characterized suddenly, contrary to the general rule, in the course of subpericardial over-fatness which has lasted for a long period of time. Again, the turning-point in such instances may take place at a comparatively early period of life, as mentioned above, and the approximate cause may be a single systemic shock (as childbirth) or repeated shocks, such as occurred recently in a case under my immediate observation.

The notes follow:

CASE I.—Mrs. W. H. S., aged forty years, came under observation September 9, 1900. Menstruation had been regular, although somewhat scanty. The patient had always been stout, and now weighs 220 pounds; height, 5 feet 8 inches. Two children born, the second one when patient was thirty-eight years of age. The father died of Bright's disease and one brother of phthisis; otherwise, family history was uneventful. The patient had enjoyed good health until four years previously, when she had a severe attack of influenza. One year later sustained a severe shock through death of a brother, and after the lapse of another year a second shock due to the prolonged second childbirth, which was attended with much hemorrhage. Following up this event exhaustion was extreme and life despaired of; but she slowly recovered, although remaining in a highly nervous condition, with marked arrhythmia and dyspnoea on slight exertion. The death of her child, at ten months of age, plunged her into profound grief, aggravating at the same time the symptoms mentioned before. Four months later I was called. Patient now suffering from cough, asth-

matic breathing, and *delirium cordis*; the pulse small, soft, compressible, and too irregular and intermittent to be recorded at the wrist. The skin surface was pale; no cardiac impulse visible; the heart could not be satisfactorily outlined by percussion, although some degree of enlargement was evident; palpation detected an exceedingly feeble, irregular, and at times intermittent impulse. On auscultation no murmur could be heard, but sibilant râles over the bronchi; a low-toned, wheezing sound on expiration was audible. The urine contained a trace of albumin, and the acidity was slightly increased. Patient extremely nervous and often weeps while in ordinary conversation; slight twitching of the muscles of the face observed almost constantly; has headaches at frequent intervals. May not some of these nervous symptoms be ascribed to uræmic intoxication? is a pertinent question. I may add that similar nervous symptoms, although less marked in two, were also observed in all of the remaining cases herein recorded. This patient has been troubled with cough and a mucoid expectoration after having lain in bed for a few hours at perfect rest. The cause of these symptoms is probably a hydrostatic bronchitis due to increased feebleness of the action of the heart while the patient is at absolute rest.

The patient has had occasional anginoid attacks during the past four months, and more recently has complained almost constantly of pain behind the lower portion of the sternum; exacerbations of præcordial pains also occur, during which she cannot lie down; has great trouble in breathing; awful forebodings; is restless, and the skin grows pale and moist. Stimulants afford relief at times, but the worst attacks demand morphine hypodermatically.

Present Condition (November 29, 1900). The attacks of anginiform pains are improving and the heart's action is somewhat more regular and slightly stronger.

December 18th. Has had fresh exacerbations as the result of over-exertion and severe angina.

There came under my notice recently a case in which the opinion that fatty change in the heart fibres was associated with extreme fatty overgrowth had been long entertained. The notes of Case II. are as follows:

CASE II.—Mrs. J. B., aged fifty years, of temperate habits; has seven children; is still menstruating regularly, although the flow has long since been somewhat scanty. The father and one sister are moderately obese; mother died of phthisis and a sister suffered in early life from acute rheumatism. The patient has had the usual childish affections, and two years previous to consulting me had an attack of influenza. Patient had become progressively stouter from the time she began to bear children up to the date of my first visit to her, at which time the bodily weight was 310½ pounds. Previous to her marriage had been moderately fleshy. For ten years there had been marked dyspnoea and palpitation on exertion, and when I first saw her locomotion was wellnigh impossible, efforts at walking being quickly followed by extreme dyspnoea, cyanosis, and by a feeling of utter exhaustion. Attacks of cardiac asthma rarely occurred, but there were no anginiform pains.

Physical examination revealed a body of enormous proportions. The impulse was feeble and diffuse to palpation. The first sound of the heart was scarcely audible and its action was both intermittent and irregular; no murmurs were present. The limits of cardiac dulness could not be made out satisfactorily, although the left boundary line was found to approach the anterior axillary line, while slight abnormal extension to the right was noted. The pulse was small, compressible, and at times intermittent (like the cardiac action). As the result of an appropriate regimen, including massage until physical exercise could be adopted, the bodily weight was reduced to 185 pounds. At this time, fourteen months after the commencement of the treatment, the patient could readily walk four miles daily, and the heart-sounds were clear and almost regular. The enlargement of the left ventricle was now slight, and the diminution in the apparent size of the heart was due largely to the removal of the subpericardial layer of fat.

It may be questioned whether this case should be classified as one of fatty infiltration in view of the favorable issue that resulted from treatment and a proper regimen. It may, however, be admitted that slight and even moderately extensive fatty infiltration is rarely curable. On the other hand, the outcome thoroughly disproves the existence of fatty change in the muscle-fibres of the myocardium, or fatty degeneration, for when once this grave disease is established it progresses to a fatal ending.

CASE III.—A. P. B., aged forty-seven years; occupation, clerk; married; consulted me May 22, 1896. Patient hereditarily predisposed to insanity and phthisis. As a young man, was perfectly healthy until the age of twenty-two years, when he began to suffer from muscular rheumatism, and on two occasions since then has had lumbago. One year prior to consulting me had sciatica, confining him to the house for two days only. Had been growing stouter in a slow and insidious manner for fifteen years; this is attributable to the habitual use of malt and spirituous liquors coupled with the lack of muscular exercise. Present weight, 210 pounds; height, 5 feet 6 inches; user of tobacco in excess. Two years previous to his first visit he began to experience peculiar sensations and discomfort in the præcordia, sometimes inducing a sense of impending death. Muscular exertion was followed immediately by moderate dyspnoea and by pain in the præcordial region, which became worse if exercise was continued, and finally he would be compelled to desist. For at least ten years has had slight winter cough and distinctly asthmatic breathing at intervals. Dyspnoea, cough, and cyanosis have been for a long time, and still are, conspicuous features.

Physical Signs. Inspection reveals corpulent frame, abdomen unusually prominent and pendent, lung expansion somewhat restricted, and the apex-beat of the heart invisible. To palpation the tactile fremitus was normal and the cardiac impulse quite feeble and irregular; the pulse-waves were small, decidedly irregular, and slightly increased in frequency; percussion shows moderate enlargement of the heart, more especially toward the left; auscultation reveals a few dry râles over

larger bronchi; sibilant and subcrepitant râles over bases posteriorly; the heart-sounds are feeble and irregular; there are no cardiac murmurs, but the aortic second sound is slightly accentuated.

The treatment embraced the withdrawal of all the alcoholic stimulants and decided restriction in the use of cigars. Methodical and persistent exercise, including light gymnastics, was enjoined, commencing with a minimum amount and gradually increasing to three and finally to four miles daily. The regimen also included a dietary calculated to overcome the obesity. Improvement in the local manifestations was soon noted, the bodily vigor and endurance were greatly increased, and the bodily weight reduced to 185 pounds. Three years later, on July 29, 1899, the following note was made: Patient still suffers occasionally from slight attacks of angina and from nuchoid pains in the intervals. The pains are aggravated by undue exertion, marked nervous disturbance, or acute indigestion. The heart's action is markedly improved in consequence of treatment, although still irregular and rarely intermittent.

The history of rheumatism in the family, as well as in the patient during early life at first gave rise to the thought that the moderate grade of arterio-sclerosis might be of rheumatic origin. The happy effects of treatment upon the arrhythmia, anginiform pains, and the general condition of the patient, however, contradicted this view and emphasized the etiological importance of the habitual use of alcohol and excessive smoking in the case. The action of alcohol in the production of obesity is well known, and the same is true of its causative influence in arterio-sclerosis. It is quite probable, at all events, that the discontinuance of these toxic substances, particularly the alcohols, had most to do with the rapid and favorable modification of the local and general condition of the patient.

CASE IV.—J. V., aged fifty-two years, American by birth, public official, consulted me on July 10, 1900. Patient weighed 225 pounds, five feet seven inches tall, and his habits were nocturnal. Has been an excessive smoker for many years. There is a clear history of rheumatism and gout in maternal ancestry. The personal history furnishes no points of value up to ten years ago, when he began to grow stout, probably in consequence of a change from an active to a sedentary, irregular life combined with a rather free use of alcoholic intoxicants. No acute illness, although dyspnoea on exertion and asthmatic at intervals, with occasional vertigo, until the onset of the complaint for which he applied for treatment. The exciting cause of the latter was probably heat-exhaustion and the improper use of cold water and ice during its treatment. Dyspnoea quickly ensued, accompanied by marked cyanosis and severe anginoid pains in the region of the heart, radiating to the neck and arms, particularly the left. The heart's action became wholly irregular, both in time and volume, and the accessible arteries were somewhat hardened; vertigo and syncope were also prominent features. The physical examination revealed a soft, low-pitched, systolic murmur near the base, with increased loudness of the aortic and pulmonary artery second sound. Dilatation of the ventricles could not be shown

by percussion, owing to the over-fatness. Although a marked improvement resulted from the treatment, which was conducted on lines similar to those in Case III., the symptoms have continued in a milder form.

The predisposing causes in this and the previous case were almost identical. The urgent symptoms (angina, *delirium cordis*, etc.) were ascribable to the acute development of heat-exhaustion, or, since they did not supervene until after the wrong use of hydrotherapy, they may have been excited by it. This is a second instance in which the evidences of infiltration following overgrowth were developed acutely. (See Case I.) These cases go to show that fatty infiltration may be latent, up to a given point at least.

CASE V.—A. B. M., aged thirty-six years: no occupation, single, weight 237 pounds (in bath); first applied for treatment February 1, 1899. Is a habitual drinker of intoxicants and particularly "spirits." The mother is rheumatic and there is a family predisposition to obesity. After suffering from childish diseases patient sustained a fall at the age of twelve years; this caused concussion of the brain, confining him to bed for three months. Patient has been stont from the time of his earliest recollection, but in recent years has suffered from vertigo and occasionally syncope, dyspnea, præcordial discomfort, and anginoid pains, particularly on muscular exercise. The palpable arteries are not hardened; the pulse is soft. On auscultating the heart an intermittence which occurred every third or fourth beat and an occasional false intermittence were noted. Slight cardiac enlargement was elicited by percussio. A faint systolic murmur was heard at the base, though not constantly. At intervals *delirium cordis* was observed. The rhythm was less intermittent and less irregular by far in the standing posture than in the sitting or the recumbent posture. True angina pectoris has not developed. Appropriate treatment for the obesity and the use of cardiac stimulants resulted in a loss of weight amounting to thirty-one pounds and an improvement in the more conspicuous features, particularly the arrhythmia, dyspnea, and cyanosis. Patient has not been under observation during the past year, although still living.

The cases briefly reported above show pretty clearly that the transition from subpericardial over-fatness to fatty infiltration may be, so far as the symptomatic indications go, abrupt, on the one hand, and too insidious to fix the date of onset of the latter complaint, on the other hand. In reviewing my cases it is seen that the most conspicuous symptoms were marked dyspnea, syncope, and utter exhaustion on muscular exercise, with cyanosis, præcordial distress, anginiform pains at frequent intervals, and less commonly true angina, well-marked arrhythmia, and even *delirium cordis*; also asthmatic breathing and certain nervous phenomena, particularly emotional disturbance and mental apprehension. A basal systolic murmur was present in two cases and cardiac enlargement was detectable in four. The urine con-

tained a trace of albumin in one (Case I.). In cases in which a murmur over the aortic area was present vertigo and syncope were annoying symptoms. It may be stated here that a basic systolic murmur is also rarely heard in cases of subpericardial over-fatness combined with vigorous cardiac contractions.

With reference to the question of diagnosis in this complaint it must be observed that neither the subjective symptoms nor the objective signs alone or in combination are conclusive, and partly for the reason that they vary considerably in different cases. The presence of the causative condition, extreme pericardial over-fatness, is all-important, and at once gives strength of probability to a diagnosis as one after another of the more characteristic features recited above put in an appearance. An assured recognition of the disease is finally arrived at only after the closest scrutiny of all the symptoms and physical signs coupled with a judicious balancing of the data entering into the previous history of the patient. Should any of the primary affections, other than extreme obesity, that are liable to lead to fatty infiltration be present, this fact would clearly bear upon the case, and the diagnosis of the special form of fatty infiltration under consideration would be precluded. Mere feebleness of the heart is not of great diagnostic value, taken alone. We see this in a variety of conditions and diseases. I desire also to reiterate the fact that slight arrhythmia is not of any value for diagnosis in fatty infiltration.

I have appended a tabulated list of cases of fatty infiltration (unassociated with degeneration of the heart). J. Daland,¹ J. H. Crocker² and others have also reported cases, but inasmuch as in all of them fatty degeneration was combined with fatty infiltration they are not included in my table.

¹ Transactions of the Pathological Society of Philadelphia, 1893 and 1894, p. 92.

² London Lancet, January 4, 1890.

No.	Name of reporter.	Age and Sex.	Weight.	Symptoms.	Arterio-sclerosis.	Mode of death.	Condition of heart.	Remarks.	
1	Satterthwaite ¹	M. 76	357 lbs.	Marked dyspnoea; pulse feeble and intermittent; impulse of heart feeble.	Slight, secondary to nephritis.	.....	.....	Lost 40 lbs.; marked improvement.
2	Satterthwaite	F. 65	181 lbs.	Color dusky, skin bathed in perspiration; pulse 100 to 104; weak impulse at apex; heart enlarged; no murmur.	.....	.....	.....	Lost 10 lbs.; felt much improved.
3	Satterthwaite	M. ...	237 lbs.	Lithemic; subject to giddiness of head, acute gaseous dyspnoea, and dyspnoea; pulse 100; no intermission; apex-beat feeble, difficult to locate; heart enlarged.	.....	.....	.....	Lost 29 lbs. in two months. General condition much better.
4	W. H. Thayer ²	M. 64	Com- pactly built; weight not given.	Previous history was negative. Patient taken ill with weak heart and indigestion. On third day pseudo-apoplectic attacks developed; dyspnoea marked until five days prior to his death; urine normal; no cardiac signs; temperature slightly elevated before death; pulse 100; setting patient up, pulse became irregular.	.....	Rather sudden.	Microscopical examination of a portion of the wall of the left ventricle revealed much interstitial fat but no fatty degeneration; fat deposits and pericarditis were noted and the heart was dilated.	Lungs congested, also peritonitis.
5	David Hunter ³	F. 77	Quite obese; weight not stated.	Had suffered from chronic malaria and secondary dementia; was confined to her bed for a few weeks (five years prior to death) with pyæmia, swelling of one knee and leg, and dyspnoea; cardiac action feeble for the last two years; was subject to swelling of feet and ankles and cyanosis, but no cardiac bruit detected; after three or four sleepless nights had dyspnoea and unusually cyanosed. She died five days afterward.	Some (chronic interstitial nephritis).	Died rather suddenly (rupture of heart).	Right ventricle ruptured, due to fatty overgrowth, with great general obesity, emphysema, and adherent pericardium.		
6	R. G. Hebbs ⁴	F. 52	Body adipose; weight not given.	Patient was anesthetized after a careful examination with negative results was made; five minutes after anesthetization had ceased patient became cyanotic and died after all means of resuscitation had failed.	Present.	Sudden	General fatty infiltration of ventricle walls. (Autopsy).	A typical case of fat-heart.	
7	O. Clemow ⁵	M. 50	230 lbs.	Patient had led an active life for several years and used malt liquors to excess. When first seen patient complained of dyspnoea and difficulty in walking. Apex-beat barely palpable, normal in position; right border extended about an inch to right of sternum; first sound muffled and indistinct at apex; no murmur anywhere; pulse 72, feeble.	As result of treatment patient appeared lean, "with heart freed from the superabundant deposit upon its surface and between its fibres."	Lungs healthy; patient became ill with hepatic congestion and lost weight; when he recovered Oertel's dietary was instituted, with marked amelioration of the symptoms.

¹ Post-Graduate, New York, March, 1899.

² Brooklyn Med. Journ., February, 1899.

³ Med. Press and Circular, April 29, 1891.

⁴ London Lancet, December 18, 1897.

REMARKS. Obviously, from these studies, pure fatty infiltration as a sequel of "subpericardial over-fatness" is an extremely rare condition.¹ Of the three fatal cases given in the table above one ended with great suddenness and the remaining two rather suddenly. It will be noted that in the case of sudden death arterio-sclerosis was associated, and in one of those that terminated rather suddenly the lesions of chronic interstitial nephritis were noted. It is evident that the arteries were also the seat of sclerotic change in the latter case. The comparative frequency of atheroma, particularly of the aortic arch and the coronaries, as an associated lesion in fatty infiltration is undoubted. Thus, Foreheimer noted it in thirty-nine out of 122 cases of fatty overgrowth gleaned from the literature prior to 1889. Of these, atheroma of the aorta occurred in twenty-one and similar lesions of the coronaries in fourteen cases. Kennedy² invites attention to the comparative rarity of ossific deposit on the valves, and this view, long since expressed, receives support from the post-mortem findings of the three cases given in the above table, since valve lesions were not noted in a single instance.

Von Stofella³ observes that when in subpericardial over-fatness the impulse is feeble and the first sound muffled and indistinct the aortic and pulmonary second sounds are of natural loudness, whereas in fatty infiltration the second sounds are feeble. If arterio-sclerosis be associated, then the second sounds may appear to be somewhat accentuated; this was true of Case IV. of my series. In Case III. slightly increased loudness of the aortic second sound was present in the absence of hardening of the peripheral arteries. The murmurs present in fatty infiltration have their usual seat in the aortic area, although they may also be heard in the mitral zone. When met at the base of the heart they are attended with troublesome cerebral symptoms, syncope and vertigo in particular. I have had no personal experience to confirm the view that this is also true of mitral murmurs in this affection. Murmurs are not constant in this disease, having been present, as previously stated, in but two of the cases reported above. They are not due to chronic valvulitis. Says Foreheimer, 'speaking of the bruit in fat-heart: "The bruit which is heard must, I take it, be due either to the irregular contraction of the muscular fibres of the heart or it must be hæmic in origin." The evidence is overwhelmingly against its being due to valvular lesions, since these are the exception in cases of fatty infiltration. Personal observation tends to confirm the belief that I have long held regarding this question; it is that the bruit heard in this affection may have different causes, many of which are as yet unknown. It can

¹ The writer would be indebted to anyone who will furnish a list of cases.

² Loc. cit.

³ Wiener Klinische Wochenschrift, 1897, vi.

⁴ Loc. cit.

scarcely be doubted, I think, that the murmur that appears in the advanced stages of the disease is at times due to relative incompetency, since many other indications of a dilated heart are in association. In some cases the murmur heard over the aortic area is attributable to an associated chronic nephritis, since the presence of a basic systolic murmur in the latter disease is a matter of common observation. Again, the bruit may be hæmic in origin or due to an abnormal, relaxed state of the heart-muscle or to weakness or insufficiency of the papillary muscles.¹ The moderate degree of enlargement in four of my cases showed itself by an increase of dulness more to the left than to the right and more in the transverse than in the vertical direction. It is probably occasioned principally by dilatation which may be preceded by and associated with some hypertrophy caused by the over-fatness. The rôle played by the infiltrated fat as well as the abnormally great subpericardial fat deposit must also be taken into account. It is always exceedingly difficult and sometimes impossible to establish the boundary lines of dulness by percussion, owing to the extreme corpulency. Not to be neglected in the treatment of these cases are measures directed to the removal of the over-fatness, the accomplishment of which enables us not only to determine accurately the size of the heart, but also to improve both the cardiac action and general condition of the patient.

A fatal termination is often due to spontaneous rupture of the heart, as occurred in all of the cases given in the above list that came to necropsy. This accident, however, does not, as shown by the clinical notes of Cases IV. and V. in the above table, invariably cause sudden death.

MULTIPLE NEURITIS AND HÆMATOPORPHYRINURIA FOLLOWING THE PROLONGED INGESTION OF TRIONAL.

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THAT poisoning by trional is an exceedingly rare condition is readily borne out by the fact that it has been freely administered in thousands of cases in the past decade for insomnia, as a sedative, and as an antipyretic in a wide range of diseases, and is generally considered a reliable and effective remedy, without untoward effects. I have been impressed by the readiness with which patients acquire the trional habit and the difficulty of inducing them to abandon its use. Their attitude² has, I think, often³ been determined by the physician who first

¹ See Schroetten, Ziemssen's Hand-book, vol. I. p. 26.

administered it to them with the assurance (which his experience has led him to believe) that trional is a safe, harmless drug, or at least as little harmful as any of our hypnotics.

While trional is an exceedingly useful drug, I believe we should always bear in mind its possible bad and even fatal effects, and for this reason I have thought it worth while to report a case of trional poisoning which came under my observation, together with several somewhat similar cases which I have been able to collect from the literature.

These cases are also interesting in that they bring vividly before us the etiological relationship existing between the ingestion of another of our synthetized organic drugs and the development of nervous affections. It is a well-recognized fact that the occurrence of neuritis has notably increased since the introduction and general use of the coal-tar products as remedies.

The following cases collected from the literature have certain points of interest not unlike my own case:

Schultz¹ reports a fatal case in a woman, aged fifty-four years, who took a gramme of trional a day for one month. After two weeks she had epigastric pain, vomiting, and loss of flesh and strength. A few days before death hæmatoporphyrin appeared in the urine.

Hecker² reports a case of "progressive paralysis" following the use of trional. There was unsteady gait, disturbances of speech, and general weakness. The patient recovered.

Reinicke³ had a patient who took trional for four months. She had, as a result, headache, vertigo, epigastric pain, and temperature of 101.6° F. The urine was black and contained albumin, casts, and blood. She recovered after the removal of the drug.

Bresslauer and Joachim,⁴ while using trional in a very large number of cases, had no severe cases of poisoning, but occasionally noted anorexia, constipation, giddiness, ataxia of the lower extremities, and oliguria.

Young⁵ noted trophic changes in the skin of a woman, aged thirty-five years, which was caused by the continuous use of trional in 15-grain doses.

Herting⁶ reports a fatal case in a patient, aged thirty years, who had taken tetronal and sulphonal and later a gramme of trional daily for a considerable period. The urine contained hæmatoporphyrin.

Gierlick⁷ saw a patient who, after the use of trional, had tremor and ataxia in the arms and legs, depression, and loss of memory. The reflexes were normal; there were no changes in sensation, no trophic disturbances, and no hæmatoporphyrinuria. All these symptoms disappeared two weeks after the withdrawal of trional.

A. Claus⁸ instances a child, aged five years, who after 10 grains of

trional walked unsteadily. A reduction in the dose caused a disappearance of the symptoms.

Stockton⁹ reports a case of acute ascending paralysis which was fatal in a woman, aged twenty-seven years. Paralysis began in the lower extremities and advanced upward. Hæmatoporphyrin was present in the urine. The etiology was not clear, but the patient had taken small amounts of trional.

Putnam¹⁰ saw a case of multiple neuritis following the use of trional and sulphonal. There was advancing paralysis, muscular tenderness, great emaciation, and death from the gradual involvement of the nerves of the heart and the respiratory muscles. The autopsy showed no changes in the cord, but a well-marked degenerative neuritis.

The history of the case which I wish to present is as follows:

Mrs. —, aged fifty years, born and bred in New York City, had for twenty years been more or less of a chronic invalid, suffering from nervous depression, insomnia, and gastric disorders. According to her own statement, she had never had a wish, which money could gratify, unsatisfied. She had consulted many of the leading practitioners of medicine in this country and various parts of Europe, had submitted to all kinds of cures and systems of treatment, and had taken a great variety of drugs. At one time she had taken a large amount of trional and was continuing its use when she first came under my care; this she was induced to gradually diminish and finally gave it up entirely for a period of several months. At this time she was neurasthenic to a marked degree, but beyond a moderate anemia there existed no organic disease.

About the middle of February, 1899, she suffered from obstinate insomnia and resumed taking trional, limiting the dose to 15 grains every other day, with an occasional intermission of three or four days. This continued until the evening of April 20th, when quite suddenly she developed pain in the abdomen of a severe colicky character, with extreme nausea and vomiting. At this time the temperature was normal and there was no abdominal tenderness or distention. The vomiting and pain continued for several days, rendering it necessary to interdict all food by the mouth and to resort to rectal alimentation. At this stage the case suggested the possibility of some acute poisoning. No further symptoms, however, could be elicited, but the administration of trional was stopped, and to control the severe pain morphine was used hypodermatically. On April 25th the heart became intermittent and there was developed a systolic murmur at the apex, transmitted to the left. At the same time the urine, which had been hitherto normal, became a dark red and contained a trace of albumin and a few granular casts. On the next day she passed only twelve ounces of nearly black urine, of a specific gravity of 1023, acid, with a small amount of albumin, no glucose, many granular casts, leucocytes, and small cuboidal epithelium; no blood. From this specimen I was able to separate by the usual methods¹¹ a substance giving the characteristic spectrum and color of hæmatoporphyrin.

The abdominal pain still continued and she complained of it bitterly.

The pulse increased in frequency and would frequently intermit; the heart action became weak and irregular, the apex murmur loud and rough, and there was added a loud murmur of aortic insufficiency. The area of cardiac dulness was moderately increased to the left. On April 30th she complained of tingling and pricking sensations about the vulva. The left knee-jerk was absent and the right was elicited with great difficulty. May 1st there was tingling in both arms; both knee-jerks were absent. On May 2d the patient complained of severe pain in the left elbow and weakness of the legs. The surface of the extremities showed diminished sensibility to tactile and thermic stimuli, but no absolute anæsthesia; this was particularly noticeable in the soles of the feet. The pain in the extremities increased, and two days later some loss of power was evident in the extensor groups of the left arm and left leg, but no actual paralysis. All the muscles reacted to Faradism, but the extensors only when a very strong current was employed. For several days there was a slight, irregular elevation of temperature, ranging from 99° to 101° F. By May 12th a well-marked drop-wrist (double) and drop-foot (double) had developed. The flexors and extensors of the wrists and ankles failed to respond to the Faradic current. Tested with galvanism the extensors showed the reaction of degeneration, while the flexors responded slowly and only to a strong current. There was marked weakness of the extensors of the legs, but they all reacted to strong Faradism. While at rest the knees were held in the position of flexion. The surface of the body (particularly of the extremities) was so hypersensitive that it was necessary to keep the bed-clothing from touching the skin. There were periods of delirium, with hallucinations of time and space. She complained of excruciating pain in the extremities and abdomen and of slight girdle sensation and constriction about the chest. Loss of weight was commencing to be very apparent. The urine contained a trace of albumin and a few casts, merely a trace of hæmatoporphyrin. Heart slightly improved in rhythm and force; murmurs still present.

For a few days the patient remained in the condition just described and then began a slow, tedious improvement. Something over a week later she had recovered some slight, voluntary power of extension over the fingers and toes, although to the electric current the muscles still showed the reaction of degeneration, and it was many weeks before the extensors reacted normally to the galvanic current and contraction to Faradic stimulation was not re-established for three months—long after voluntary contraction was well advanced. There were moderate contractures of the ham-strings and Achilles tendon in spite of the use of passive motion and the application of correcting apparatus. These contractures gradually disappeared when the patient was able to use her hands and relearn to walk. There was considerable ataxia at times, but probably only such as would be accounted for by muscular weakness. The emaciation was extreme, the weight falling from 153 to 90 pounds. After some weeks the kidneys regained their normal condition. The heart slowly returned to the normal, leaving no evidence of valvular disease or enlargement. For a period of ten days there was a marked oedema of the lower extremities, which, however, disappeared with the improvement in the action of the heart. At the end of a year from the onset the patient was just beginning to walk without assistance. The recovery has since become complete.

This case brings out a number of points of special interest. The whole amount of trional ingested was not what one would ordinarily consider excessive—i. e., about thirty doses of 15 grains each, a total of 450 grains for the two months. The onset presented the picture of a case of acute gastro-intestinal poisoning. Following this there was an acute degeneration of the kidneys and the presence in the urine of hæmatoporphyrin—a substance which is usually associated with poisoning by sulphonal and trional. The first of the nervous manifestations was a neuritis of the vagus and a subsequent trophic disturbance in the heart muscle resulting in dilatation and valvular insufficiency. The nature of the heart lesion seems clear in the light of the subsequent course, for with the improvement in the muscular tone the dilatation and valvular incompetence entirely disappeared, leaving a normal heart. Among other trophic changes may be noted the extreme emaciation and a marked thickening of the tissues about the joints of the fingers, which still remains.

The more marked affection of certain definite groups of muscles—*e. g.*, the extensors of the wrists and feet—suggests the selective action of trional for certain nerves or groups of cells in the anterior horns of the cord, not unlike that of the metallic poisons.

The nerves recovered their function in the same order in which they were impaired, viz., first the vagus, next those of the extremities of the left side of the body, and lastly those of the right side.

In view of the similarity in chemical constitution of trional and sulphonal it is not surprising that their toxic effects should have a close parallel; this is borne out by the manifestations of a number of cases of sulphonal poisoning to be found in the literature. As to how trional produces its various injurious effects is a question of some doubt. One theory⁷ ascribes to it a specific toxicity to the cells in the anterior horns of the spinal cord. In a case of sulphonal poisoning in which there had been weakness and ataxia of the lower extremities Helwig¹² reports an autopsy showing a degeneration of the cells of the anterior horns of the lower cord.

Another theory is that trional causes a very slow oxidation of the cells of the central nervous system, and this when long continued produces permanent changes, the manifestations in the stomach, bowels, and urine being secondary. It seems to me, however, that our theory must be even broader than this in order to include cases like that of Putnam,¹⁰ in which on autopsy the lesion was found entirely confined to the peripheral nerves, the cord and brain being found normal.

Hæmatoporphyrin has been described as occurring in a variety of conditions associated with lesions of the nervous system. Ogden¹³ reports hæmatoporphyrin as present in a fatal case of post-diphtheritic paralysis and Nakarai¹⁴ isolated the pigment from the urine of six

cases of lead poisoning. In sulphonal poisoning its presence has been frequently demonstrated. The exact cause and mode of its production are still unknown. By some it is claimed that the original toxic substance acts as a direct irritant to the kidneys; by others that the function of the kidneys is modified by changes in the central nervous system. My own cases would argue for the latter theory, as the change in the urine did not appear until some time after the development of the nervous symptoms and a considerable period after the withholding of the drug.

Some years ago Morro¹⁵ demonstrated that trional had a cumulative action, and this should be borne in mind when administering the drug for an extended period. It should not be given continuously, and while being used the bowels and kidneys should be kept active. To aid in the elimination of trional Goldman¹⁶ recommends that citric acid be exhibited with it, and suggests that, if the urine becomes dark or cloudy, bicarbonate of soda and the drinking of aerated waters should ward off more serious developments.

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REVIEWS.

IMPERATIVE SURGERY. By HOWARD LILLIENTHAL, M.D., Attending Surgeon to Mount Sinai Hospital, New York City. New York: The Macmillan Company.

THE tendency which in modern times has led to the fine subdivisions of labor has caused the creation of specialisms in science. Specialism of the proper sort is very useful. It develops individuals notable for skill and distinguished for exact and profound knowledge. It leads to the accumulation of a multitude of careful observations. It stimulates authorship, experiment, and discovery. As Oliver Wendell Holmes says: "Specialists are the coral insects which build up the reef."

There are not wanting signs, however, that specialism has gone too far, and we know positively that not a few specialists have no proper equipment for their responsible occupations. A man should not be allowed to proclaim himself a specialist any more than Wilkins Micawber, Jr., could proclaim himself a lawyer; he should become a specialist in the natural course of things, because of peculiar opportunity; from breadth of information, not from narrowness; because of much knowledge, not because of the absence of it. A man who takes up an exclusive specialty soon after graduation, without having had the training of some years of general practice, almost inevitably becomes the narrow man, the one-sided man, the man who unduly exalts his particular line of work and unjustly depreciates the work of others.

The general practitioner is sometimes too general. He is often not special enough. He usually resolutely declines to invade the domain of surgery, and in this self-abnegation, as a general rule, displays wisdom and an accurate estimate of realities. Surgery can be done well and quickly only by one who has had considerable experience and has trained himself by patient toil; but the general practitioner ought to be capable of meeting successfully, if not brilliantly, the common emergencies of surgery.

We do not mean that he should become a surgeon. We particularly would not convey the idea that he should ever undertake a difficult operation when no real emergency exists. What we do mean is that he should be able to apply the proper treatment—operative treatment, if necessary—to conditions which threaten life unless there is prompt intervention.

Some general practitioners do accident surgery admirably, and we encounter these men particularly in mining and manufacturing regions and in railroad towns. Many general practitioners will not attempt surgery even in an emergency. Numbers do attempt it, and bungle in the trial. Dr. Lillienthal is persuaded that general practitioners should be able to cope with surgical emergencies, and he has written this book to aid them. He addresses his book to: "The practitioner of general medicine who rarely takes up the scalpel; the specialist whose path seldom leads him to the operating-room, and the recent graduate who,

although versed in the lore of books and lectures, has seen but little surgery at close range."

The author says of his book that "it deals only with the diagnosis and treatment of conditions which demand immediate operative measures, and it presupposes the absence of a surgeon and the impossibility or inexpediency of removing the patient or of waiting for expert assistance." Lilienthal's views as to the duties of the conscientious physician are as follows:

"Confronted by a grave emergency, where the life of a human being seems to hang upon the possibility of relief through surgical skill, the conscientious physician, when he feels that he is not sufficiently versed in the art and method of operating, will seek the assistance of an expert. Should time and place conspire, however, to make the presence of a surgeon impossible, the entire responsibility devolves upon the one who may chance to find himself in charge; and unless he is willing to assume the risks of hesitation he must act the part of a surgeon and perform, to the best of his ability, the work before him. Again, should the crisis be one not of life or death, but where lingering disease or lasting deformity will probably follow delay, it is the clear duty of the physician to act and tide over the critical period."

These opinions are in line with the well-known views of the elder Senn, who has said (*Pacific Medical Journal*, August, 1899): "Every physician qualified to practice his profession should have the necessary knowledge and manual dexterity to perform, at a moment's notice and with the simplest instruments and limited assistance, all life-saving operations in all cases in which prompt action is necessary to meet the urgent indications. In large cities the medical practitioner can secure the services of a professional surgeon without much loss of time, but occasionally he will be confronted by a case in which he has to act in order to save life. But the mass of general practitioners throughout the country are frequently thrown upon their own resources, and must be prepared to perform the most difficult operations when the loss of time necessary to secure surgical aid would jeopardize the life of the patient. A fair percentage of the practice and income of the village and country practitioners consists of and is derived from emergency work."

"The average medical student is more interested in surgery than in medicine, and I am sure the surgical training he receives ought to qualify him to practice emergency surgery with credit to himself and benefit to his patients. Most of the accident cases and surgical diseases requiring prompt operative treatment, as a rule, first come to the attention of the general practitioner. In accident cases the first aid rendered often determines the fate of the patient. Neglect and mistakes made in such instances are often difficult to balance and correct later. The general practitioner must be familiar with surgical diagnosis and must acquire surgical technique sufficient for him to act timely, wisely, and safely in all surgical cases in which immediate interference is an absolute necessity to save life or to protect the patient against remote disastrous complications. No physician should receive a diploma or practice his profession unless he is fully qualified to meet these requirements."

Lilienthal's book in most respects is admirable. The descriptions of operations are terse and clear, the directions are definite, and the cuts are not only beautiful, but really show something. The book comprises over four hundred pages, and the text is illustrated with more

than one hundred and fifty illustrations, most of them being "from photographs or drawings made during the progress of actual work in the author's practice."

In Chapter I. he enumerates the instruments of surgery and describes their uses, speaks of the materials for dressings and their preparation, sponges and their substitutes, sterilization, splints, and other rigid dressings. In the subsequent chapters he considers wounds and their treatment, the performance of an operation in a dwelling-room, the healing of wounds, special forms of infection (*i. e.*, erysipelas, phlegmon, abscess, furuncle, carbuncle, malignant pustule, acute osteomyelitis, acute suppurative arthritis), and the drainage of suppurating joints. He then proceeds to discuss wounds, injuries, and diseases of the head and face, the neck, the extremities, the thorax, and the abdomen; intestinal obstruction, acute appendicitis, suppuration of the liver and gall-bladder, strangulated hernia, acute diffuse peritonitis; wounds, injuries and diseases of the rectum and anus; of the genito-urinary organs of the male; of the generative organs of the female; of the eye and orbital region, and of the ear and mastoid region.

In some instances we think Lilienthal forces the issue and goes a shade too far. It seems scarcely proper to advise a general practitioner who has not had any surgical training to perform gastrostomy, intestinal resection, œsophagotomy, and the radical cure of hernia after the relief of a strangulation. Were he to do these things he might become a veritable and ghastly emergency himself. We feel the same way in regard to appendicitis unless there is an abscess adherent to the belly wall. In this connection we refer the reader to the impressive remarks made by Weller Van Hook in one of the best papers we have ever read on the "Technique of Operations for Acute Appendicitis" (*Journal of the American Medical Association*, February 20, 1897). He says that a person who has never operated, or has only occasionally operated, should be persuaded that the operation for appendicitis is by no means always easy and simple. He considers it a matter for surprise and almost for horror to find that the majority of writers give an opposite impression, or, like Sonnenburg, assert that the operation is simple. It is Van Hook's positive conviction that one hundred cases of acute appendicitis will show a higher percentage of recovery under medical treatment, with incision of pointing abscess, than will one hundred like cases operated upon by one hundred surgeons, or even by twenty surgeons, who are gaining their first experience.

In spite of our disagreement with some of Dr. Lilienthal's contentions as to what cases are to be considered as emergencies justifying immediate surgical attack by the attending physician, we regard the book a timely one, and also esteem it as a carefully-written, entertaining, and instructive production.

J. C. DA C.

A TREATISE ON MENTAL DISEASES. By HENRY J. BERKLEY, M.D., Clinical Professor of Psychiatry in the Johns Hopkins University; Chief Visiting Physician to the City Insane Asylum, Baltimore. Pp. 601. New York: D. Appleton & Co., 1900.

THE *Treatise* of Dr. Berkley, as the contents show, is an important study of the literature and pathology of mental diseases. Appearing

during the closing year of the century, it may be classed with other recent books upon the same subject that contain the last and best words that have been written during this wonderful cycle. As the close of a century is suggestive of retrospection, so the opening of a new one admits of a note of comparison between the beginning of the old and the new and stimulates a hope of greater acquisition of knowledge during the period on which we have now entered. At the beginning of the last century only two or three efforts of a primitive character existed in America for the care and treatment of the insane. During the latter half of this period only was an approach made toward the scientific study of mental disease. The earlier insanity literature (Pinel and Esquirol) was devoted mainly to the psychical manifestations of mental disease. Such gross pathological lesions only as were apparent to the unassisted eye were described. The histological studies of the structure of brain and nervous tissues in recent years, supplemented by the revelations of the microscope and improved technical methods, have materially aided investigations of the pathology of mental disease as well as those affections of the nervous system that are unattended with morbid mental conditions. This advance may be said to have had a beginning during the latter third of the century just closed. There seems to be recognized at last a field, with well-defined limitations, within which the alienist, the neurologist, and the pathologist may each, in his own way, during the coming century engage harmoniously in the solution of the problems that confront him, unvexed by jealousies and contentions.

Dr. Berkley has clearly shown in his book the co-ordination and relation of pathology and psychiatry, which may be stated to comprise the two grand divisions of the work. Ninety-five pages are devoted to histology of the central nervous system and general pathology. Much of this portion is of a high technical character, and while it may not be fully appreciated by every reader, yet on examination it must be conceded that all of the studies have been carefully made along approved lines and that the conclusions are logically correct. The portion of Part II., devoted to Special Pathology and Pathology of the Cerebral Vessels, is of interest in these days of the discussion about the neuron and intracranial circulation. Investigations in cell pathology have been advanced by improved methods of staining or experimental technique, which are explained in detail, so that the author confidently assumes "the veil is being slowly withdrawn and we are able to distinguish the true from the artificial lesion." While the pathologist by mechanical and other devices may thus bring us in close touch with the very centres from which psychic action proceeds, yet notwithstanding the ambitions of science, we have no expectation the chasm will be crossed or that the impenetrable secret of psychical force will be readily yielded, though it may continue to be a subject for theorizing and speculation.

The important chapter on Pathology of the Cerebral Arteries and Veins is a practical demonstration of the effect of irritant poisons, as alcohol, syphilis, and other toxins, in the production of arterio-sclerosis and endarteritis. It is illustrated by several plates in colors showing the various degenerations that result from toxic and other agencies which affect the middle and inner coats of vessels, the lumen, and surrounding tissues, and go far to demonstrate the manner in which the

nutrition of the nervous mass may be affected, and account for other clinical aspects of mental disease.

The remainder of the book, or over four hundred pages, is devoted to the symptoms, causes, and therapy of mental diseases. The author recognizes the difficulties surrounding an accurate classification of the many forms of insanity and the confusion that has resulted. There are objections to a nomenclature founded upon clinical symptoms, yet during the course of the disease the psychical or mental manifestations may be the only evidence of any departure from the normal state. The "etiological basis is equally defective, as the causation is frequently unknown," and from it various forms may be evolved, and causes so called are too speculative to have value. A classification based upon the morbid anatomy might be considered valuable if a sufficient amount of knowledge had been already accumulated. As every writer has assumed to himself the privilege of conforming a nomenclature to suit his own views, the author has made a venture in this direction in parts of his book. For instance, he uses terms to describe forms of insanity as having an adjective sense, namely, "syphilitic insanity," "alcoholic melancholia," "alcoholic epileptic insanity," "menstrual insanity," "religious paranoia," etc. Many of these terms and other forms so called used by writers are misleading and only add to the existing confusion by conveying an impression that they stand for distinct entities or diseases, whereas they are only stages or symptoms that appear in the course or progress of a case of insanity or common to many forms from divers causes. The general adoption of such a nomenclature would be a warrant to assign an insanity to any supposed cause, illustrating rather the theories and resources of a writer than results of clinical study. We have supposed the tendencies in recent years were rather to restrict than expand the nomenclature. We forbear criticism, however, as the author has introduced so many good and helpful forms and special studies, as "insanities without ascertainable alteration of brain substance," "insanities consecutive to organic lesions of the cerebral substance," "intoxication insanity," "insanities following bacterial and toxalbumic poisoning," "insanities following autogenic poisoning," "insanities of the psychical degenerate," and those accompanying or following "constitutional neurosis."

The author arranges the several forms of mental disease under four groups as most convenient, and, we may add, most helpful for study, viz.: Group I. *Mental diseases without ascertainable pathological alteration of the brain substance.* Group II. *Mental diseases sequential to ascertainable alteration of the brain substance.* Group III. *Insanities due to inherited or acquired mental instability.* Group IV. *Studies of complete or incomplete retardation of the psychical (and physical) development.*

This grouping is strictly correct and comprehensive. Under the first can be included all cases of mental disease having an origin in neurasthenic conditions (from whatever causes they may arise), sepsis, and toxic agencies that result in disordered mental manifestations. In this group may be placed acute insanities complicated with delirium, acute delirium, and acute delirious mania. This method of grouping is also most helpful in forming an opinion as to the prognosis of a case, the first group furnishing the greatest proportion of recoveries in hospital reports. It may be further said of this group that, notwithstanding the

acuteness of the symptoms, when death takes place little or no trace of disease is discovered. Whatever evidences of disease may have existed before death they disappear subsequently or cannot then be discovered. The author has properly emphasized and described a large number of mental affections belonging to this group, which is a marked feature of this and other recent books on mental disease. While the pathologist has been engrossed in the examination of cells and cutting sections, less attention, in comparison with the importance of the problem, has been given to the condition and quality of the circulation and functional disturbances of the bodily organs which have so much to do with the best treatment of the insane. There are unquestionably many cures directly effected by medical treatment, and we are waiting for the physiological chemist rather than the pathologist to tell us what has been done to restore our patient and how the methods may be improved. The field is open, but this phase of the subject has scarcely been touched even in the recent books.

This volume, presenting honestly the results of scientific work, much of it done or verified by Dr. Berkley, should be welcomed and its contributions added to the general stock. It may be said of all insanity books that their authors and their readers deal with complex and *unknown conditions that are not yet susceptible of mathematical demonstration*. As a consequence, a personal element may even enter here which impairs the value or estimate to be placed upon criticism.

In a "note" or preface Dr. Berkley makes the announcement that "the absence from English literature of a comprehensive practical work on mental diseases has led the writer to prepare this treatise, embodying a consideration of all the principal forms of psychical disturbance." Notwithstanding that under the head of "Literature," which follows many chapters or parts, 432 references to Continental writers and only eighty-three belonging to English-speaking people are made, the assumption which is implied that an "absence" or even dearth actually exists will hardly be received without dissent.

J. B. C.

DEUTSCHE MEDICIN IM NEUNZEHNTEN JAHRHUNDERT. Sacular-Artikeln der Berliner klinischen Wochenschrift. Herausgegeben von C. A. EWALD und C. POSNER. Band I. Berlin: Verlag von August Hirschwald, 1901.

GERMAN MEDICINE IN THE NINETEENTH CENTURY. Edited by C. A. EWALD and C. POSNER.

THE articles contained in the volume before us are reprinted from the *Berliner klinischen Wochenschrift*. All of them treat of some technical subject, especially referring to the histological aspect. Attention has been called so frequently and in such various places to the wonderful advances made in the past century that special works treating of advances of special peoples have a local and also a general value. While the title indicates an especial attention to the German contributions to the medical sciences, the editors are careful to state in their preface that a narrow reference to the work of Ger-

man physicians alone would give a very imperfect view of the progress of science, and while they point with pardonable pride to the contributions of Germans to philosophy and natural history, and especially to medical science, they admit the equal value of other contributors. We cannot undertake to review the articles in the volume before us. Their character may be judged by a few of the titles. Virchow contributes a short discussion of the influence of new names and new points of view in determining progress in pathology, and shows the importance of proper names for newly discovered conditions and for new aspects of known conditions, instancing some of the diseases or pathological processes which he himself discovered. Hirschberg's article on the development of ophthalmological knowledge in the nineteenth century is long and interesting and will be consulted by all who have a special interest in this study. Ewald in discussing auto-intoxication, Ponfick in an account of the development of knowledge regarding inflammation, Schleich in a paper on local anæsthesia and narcosis, Frosch in a contribution on the plague in the light of recent investigations, Flemming in a paper on cell-division, Babes in a discussion of rabies from the beginning to the end of the nineteenth century, contribute interesting accounts of subjects of unusual importance and interest at the present time or of topics that have assumed new importance from changed points of view.

Taken as a whole, the twenty-six articles in the present volume are most interesting expositions of the development and present status of knowledge regarding a variety of topics. A. S.

A PRACTICAL TREATISE ON FRACTURES AND DISLOCATIONS. By LEWIS A. STIMSON, B.A., M.D., LL.D., Professor of Surgery in Cornell University Medical College, New York; Surgeon to the New York and Hudson Street Hospitals, etc. Third edition, revised and enlarged, with 336 illustrations and 32 plates in monotint. New York and Philadelphia: Lea Brothers & Co., 1900.

THE present edition is issued about a year after the appearance of the second edition. It is evident from this fact that the subject of fractures still has a firm hold on the profession in spite of the allurements of operative surgery. It also speaks well for the value of the book itself.

The subject of fractures was almost wholly rewritten for the edition of 1899. The question of operative reduction in the treatment of dislocations was also discussed.

In the present edition numerous additions have been made, one of the most important being traumatic hæmatomyelia in reference to the prognosis and treatment of injuries of the spinal cord.

Twenty new illustrations have been substituted or added, and the number of plates has been increased from twenty to thirty-two, with nineteen new figures, all but one being reproductions of skiagrams.

The subject of fractures is treated in 401 pages, and while as much is given as the space permits there is still need for a somewhat more elaborate treatment of some parts. The literature on the subject of

fractures has been tremendous and allusions to all the new suggestions is impossible, still we would have liked to have seen the operative treatment of fractures discussed more in detail. It is one of the active issues of the day. The numerous additions of new skiagrams show that attention has been devoted to that method of examination. In the treatment of fractures of the elbow-joint by full flexion the author states that it is no more convenient than rectangular flexion and gives no more security against displacement. While we believe he is nearly or quite right in his conclusions, it still seems a rather cursory way to treat a subject in favor of which so much has been written in recent years. In the chapter on Fractures of the Skull those of the base are hardly more than alluded to. It is to be regretted that the excellent work of Charles Phelps on the *Traumatic Injuries of the Brain* is not even mentioned. The chapter on Dislocations of the Hip contains no reference to the recent work of Osear H. Allis. In importance it is at least equal to if not greater than that of Bigelow's. McBurney's method of reducing a dislocation of the shoulder with fracture is given, but not Allis' method of reducing a dislocated hip with fracture. In the treatment of congenital dislocations of the hip Lorenz has discarded his own operations and now advocates forced extension and reposition. While some omissions occur, they are not sufficiently numerous to mar the work, and, taken as a whole, we like it perhaps better than any other treatise on the subject in our language. The method of treatment of the various subjects is perfectly clear and intelligent. The information contained is extensive and the advice given is sound. It is evidently the work of an accomplished surgeon of wide experience and good judgment, and is expressed in a style free from verbosity or obscurity. It is a volume which should find a place on the shelves of every practitioner who is called to treat fractures or dislocations.

G. G. D.

NORMAL HISTOLOGY. By EDWARD K. DUNHAM, Ph.B., M.D., Professor of General Pathology, Bacteriology, and Hygiene in the University and Bellevue Hospital Medical College, New York. Second edition. 318 pages, 244 illustrations. New York and Philadelphia: Lea Brothers & Co., 1900.

OWING to the important relation of the study of histology to both normal and pathological anatomy, it is desirable that the student of medicine begin this subject early in his course. It is, therefore, of great consequence to his future progress that the method of his study be carefully considered. It is, for example, of the utmost importance that the broad, fundamental principles of the science be inculcated and that proper attention be given to the cultivation of the scientific habit of mind.

The volume under discussion has evidently been written with full appreciation of these facts. An introductory chapter prepares the student for a consideration of the distinctions between the different elementary tissues as well as for an account of the cell and its properties. The succeeding chapters, which follow in what might be called the

usual order, constitute a concise exposition of the known facts of the science.

A criticism that might be made is that the text, in many places, is rather too brief and lacking in emphasis of salient points. This is notably true of the chapter dealing with the liver, where clearness has been sacrificed to conciseness. This is a fault in that it presupposes upon the part of the student a knowledge of the subject which usually he does not have.

The book is adequately and beautifully illustrated, many of the 244 engravings being original.

An excellent chapter on Histological Technique constitutes Part II. of the volume. The typography is in line with the usual high character of the Messrs. Lea Brothers & Co.'s publications. J. C. H.

PATHOLOGY AND MORBID ANATOMY. By T. HENRY GREEN, M.D., F.R.C.P., Physician and Lecturer on Clinical Medicine at Charing Cross Hospital, and Senior Physician to the Hospital for Consumption and Diseases of the Chest, Brompton. Revised and enlarged by H. MONTAGUE MURRAY, M.D., F.R.C.P., Physician to the Out-patients and Lecturer on Pathology and Morbid Anatomy at Charing Cross Hospital. Ninth American, revised from the ninth English edition, by WALTON MARTIN, Ph.B., M.D., Assistant Demonstrator of Anatomy, College of Physicians and Surgeons, Columbia University; Attending Surgeon to the Out-patient Department, Roosevelt Hospital. 565 pages, with 4 colored plates and 339 illustrations. Philadelphia and New York: Lea Brothers & Co., 1900.

This well-known, very useful, and readable text-book, which originally included only general pathology, has met at the hands of its revisers a metamorphosis in which it has lost none of its original value and interest, though transformed into a complete treatise upon pathology and morbid anatomy. It has, moreover, in a most remarkable manner been made to include an immense amount of new material without appearing to have lost any of the valuable matter it contained before, yet without greatly increasing its size.

The edition of 1900 is greatly improved over that of 1898 both by the introduction of many new illustrations and a revision of the text. In his preface Dr. Murray apologizes that "some increase in the size of the book has been found unavoidable," yet upon comparing the two editions we find that of 1898 contains 571 pages, and that of 1900 565, the size of the new pages being but little larger than the old ones.

The book opens with a new chapter upon Malformations. The matter all through has been revised and much of it rewritten. It seems to be thoroughly up to date. Excellent new figures have been introduced, among which should be mentioned a skiagraph showing a hand with chondromata and reproductions of photographs of the topography of the brain and some of its lesions.

The title-page announces that the book has four colored plates, but

we find that while there are four plates, only three of them are colored. These are very good and represent the malarial parasites and the important blood diseases. The uncolored plate shows normal and degenerated nerve cells stained by Nissl's method.

The pathology of nutrition is omitted, probably because of the space it would necessitate. It is, however, a disappointment to find diabetes, uræmia, scurvy, cachexia, acromegaly, myxœdema, Addison's disease, etc., either not mentioned at all or given a few lines under other headings. This is particularly true, because the author has thought it necessary to devote so much space to general considerations regarding the bacteria, their biology, cultivation, and observation. While the matter upon bacteriology is certainly good and undoubtedly very important, it is very likely that a student of medicine will refer to some text-book upon bacteria for his knowledge of them rather than receive it from this brief writing. On the other hand, as there are few other sources of information concerning the pathology of nutrition and metabolism, he might be glad to derive it from his text-book of pathology.

J. McF.

DISEASES OF THE NERVOUS SYSTEM. By H. OPPENHEIM, M.D. Authorized translation by EDWARD E. MAYER, A.M., M.D. First American from the second revised and enlarged German edition. Philadelphia and London: J. B. Lippincott Company, 1900.

It is hardly necessary to review this book except as a translation, as the first German edition has been before the public since 1894. Every neurologist who is familiar with the German language has long ere this learned to appreciate Oppenheim's text-book; but, unfortunately, it was a sealed volume to many whose knowledge did not extend beyond the English language, and Dr. Mayer, therefore, has rendered a valuable service to the great English-reading medical public. The amount of information that Oppenheim has crowded into 874 pages (American edition) is remarkable, and it is this condensation that makes the volume so valuable to the student and the busy practitioner, who want the important facts of neurology in as small a compass as is consistent with accuracy. The illustrations are satisfactory, although some could be improved upon, notably the one on page 94. Illustrations may be of value in the teaching of nervous diseases, especially when accompanied by legends containing a short description of the case represented. The translator has not been enslaved to a notable degree by German methods and forms of expression, but has made a liberal translation, and yet one that appears to be accurate. This is more difficult to do from the German than from the French. Occasionally expressions are detected that are somewhat objectionable, as, for example, "gravity abscess." This is a literal translation of *senkungsabscess*, but the English expression is less pleasing to the ear than the German. The translator must have been frequently puzzled in selecting the best English equivalent for the German. This American edition will doubtless be of much service.

W. G. S.

PROGRESS OF MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Mechanical Treatment of Anasarca.—K. DEHIO (*St. Petersburg med. Wochenschrift*, December 23, 1900) discusses the methods that have been suggested for the mechanical treatment of anasarca and describes the apparatus which he has devised for this purpose. It consists of a rubber band widened at one area, at which point there is an opening about 8 cm. in diameter. In this opening is placed a rubber funnel, which is fastened to the band. The outlet of the funnel is connected with the tube, and after careful disinfection of the skin a number of incisions are made close to each other, the funnel is closed by means of the band, and the incised area is kept absolutely protected from air and from infection. He reports fifteen cases which he has treated with this apparatus, with apparently extremely successful results. He states that as much as ten or twelve litres may escape in this way in one day. It is important not to put the funnel on very tightly, as this interferes with the flow; it is merely essential that it shall be so applied that air cannot enter beneath it. It is always important that the patient should lie with the incised area on a low level. Dehio believes that proper mechanical treatment of anasarca will have very successful results if it is undertaken sufficiently early. One valuable point about the apparatus is that it allows of a ready collection of the fluid. He describes the fluid which he obtained in a series of cases of nephritis, and compares it with that obtained in cardiac failure with general venous stasis. The most striking fact was that while the albumin in the cardiac cases (estimated by the Eszbach method) was always above two parts in a thousand and reached as high as five parts in a thousand, in the nephritic cases it never went above 1.5 parts in a thousand and in most cases was present in traces only, but estimation of the nitrogen showed that this was about equal in the two classes of cases; it was a little higher, as a rule, in the cardiac cases, but there was not a great difference. The conclusion which Dehio

reaches after examination of these figures is that in nephritis the fluid of the anasarca contains, beside albumin, some nitrogenous substances which are absent in the mechanical œdema of cardiac disease. These are probably products of protein metabolism which are not properly excreted through the urine. He also discussed the character of the fluids seen in ascites, in hydrothorax, and in anasarca. The observations of other workers have shown that in general the transudates in cases of nephritis are of lower specific gravity than in cases of cardiac failure. In nephritis, for instance, the specific gravity of the ascitic fluid averages about 1006, that of hydrothorax 1007, and that of anasarca (Dehio) 1007. With general cardiac failure the ascitic fluid is about 1012, the fluid of hydrothorax is about the same, while that of anasarca (Dehio) is almost the same as the anasarca of chronic nephritis—i. e., 1008. The fluids of hydrothorax and ascites have been found to contain much less albumin in cases of nephritis than in general circulatory failure—conditions similar to those found by Dehio in anasarca. For instance, the ascites of nephritis was found to contain 0.2 per cent. and that of general circulatory stasis 1.7 per cent. It is notable that the fluid of the subcutaneous tissues seems, according to Dehio's investigations, to be much poorer in albumin than that of transudates into the peritoneal and pleural cavities, as his average for anasarca was in cardiac cases 0.36 per cent. albumin, while in ascites and hydrothorax there have been found 1.6 per cent. and 1.3 per cent. The results which Dehio obtained seemed to confirm the statement previously made by Hoffmann, that if the fluid of anasarca contains less than 0.1 per cent. of albumin, severe disease of the kidneys may be diagnosed. Dehio noticed all grades of variation between the very low percentage in pure nephritic cases and the high percentage in cardiac cases—a very natural observation, as the renal condition and the cardiac condition have varying degrees of importance in such cases, and it is only rarely that anasarca is purely nephritic or purely cardiac. He compares the results of the study of the œdema fluid and normal blood plasma, and directs attention to the fact that while salts were present in both cases in about the same amount the albumin and the dry residue in general were far greater in blood plasma than in the fluid of œdema. This indicates, to his mind, that in œdema the capillary walls permit the salts to pass very easily, while they maintain considerable resistance against the passage of albumin and other organic substances.

Bacteriology of Rheumatism—F. MEYER (*Deutsche med. Wochenschrift*, February 7, 1901) states that in investigating cases of acute articular rheumatism bacteriologically, after unsatisfactory results from the direct examination of the joint exudate, he made cultures from the tonsils and discovered practically regularly the presence of a diplococcus which grew in chains and which in its bacteriological characteristics had a close resemblance to the organism previously described by Wassermann, but was not identical with it. This organism was not found on the tonsils of persons who had not acute rheumatism. When injected into animals it produced a sero-purulent exudation in the joints, which was usually sterile. In about one-fifth of the animals so injected there was a verrucose or ulcerative endocarditis. He does not think that one can yet state positively whether the strep-

tooccus is actually the cause of rheumatism, or if it is the cause of rheumatism whether it is the only cause. The number of cases as yet investigated is too small.

MENZER (*Deutsche med. Wochenschrift*, February 14, 1901), in discussing Meyer's results, directs attention to the fact that streptococci have been found repeatedly on the tonsils and in the joint exudate in cases of rheumatism, and that Meyer's results, while important, are not wholly new, though the fact that the streptococci found by him and by Wassermann produced changes in the joints and endocardium is important. He describes his own results in four cases. In two of these the exudate from the joints showed the presence of streptococci, of diplococcus form, and in three cases, one of which was one of those previously mentioned, he obtained diplococci in streptococcic form from the substance of the tonsils. Portions of the tonsils was excised and bacteriological preparations were made from the cut surface. He thinks that it is still a question whether one will constantly be able in cases of acute rheumatism to obtain bacteria which produce joint changes in animals. It is also doubtful whether only the streptococci that have been found will show these characteristics. It is further necessary to consider the possibility that such changes may be produced by the micro-organisms which are found on the tonsils in normal persons. He considers it possible that some one form of organism among those already described will be found to be the specific cause of acute rheumatism, though this is certainly doubtful, considering the close relation which rheumatism bears to atypical rheumatoid affections and to pyæmia. Still, from a clinical standpoint, rheumatism, to his mind, presents the appearance of a morbus sui generis.

Bacteriological Examination in a Case Resembling Typhoid Fever —
SCHOTTMÜLLER (*Deutsche med. Wochenschrift*, 1900, No. 32) has examined the blood in fifty cases of typhoid fever, and found the specific bacilli in forty. Among the cases was one clinically resembling typhoid, in a patient who, convalescent from erysipeloid of the finger, was observed from the beginning. After three days of subnormal temperature the disease began with malaise, headache, and coryza; slight redness of the conjunctiva, the nasal mucous membranes, and pharynx. The temperature was 104°, pulse 80, full and regular. On the fourth day the spleen could be felt. On the sixth day the conjunctiva was normal, the tongue dry and red; there was bronchitis. On the ninth day roseolæ appeared, and became more numerous in the following days. Continued fever, at about 104°, lasted ten days. Lysis then began; convalescence was interrupted by slight elevations of temperature. There were no characteristic stools. The blood on the sixth day gave colonies of bacilli, resembling those of typhoid fever in many respects, especially morphologically and tinctorially, but differing in others. It did not coagulate milk; it produced acid; it did not form indol, but it caused fermentation. The serum reaction of the patient was negative with fresh typhoid cultures in dilutions of 1:20 to 1:100. The patient's own serum caused agglutination of his own cultures at 1:50 and 1:20, but not at 1:100, but after the fever even a dilution of 1:100 was effective on the new bacilli, not on typhoid cultures. Serum from other cases of typhoid fever

caused no agglutination, except in one case, at 1:20. The case brings additional proof that we can have a disease clinically resembling typhoid fever without the specific bacilli. In the present instance we are without evidence as to the anatomical changes. The condition is obviously rare, but aside from its general interest it may have some bearing on the exceptional cases of typhoid that do not give the Widal reaction.

Septic Endocarditis.—E. MÜNZER (*Zeitschrift für Heilkunde*, Band xxi., p. 251) particularly directs the attention of the general practitioner to the not infrequent occurrence of prolonged febrile conditions of obscure origin, and dwells on the importance of the group of cases, belonging under this heading, which Litten terms chronic recurring septic endocarditis. Münzer reports a series of cases. In three of these there was a very definite relation to rheumatism or association with this disease, at any rate; in two cases the symptoms of endocarditis occurred after articular rheumatism, in the third after muscular rheumatism. The general relation between rheumatism and endocarditis is well known, and it is now recognized that rheumatism is of bacterial origin; also, it is known that the micro-organisms found in rheumatism are generally those that are found in septic endocarditis, hence a possible connection between the two diseases is readily seen. It is very difficult to draw the line between mere benign rheumatic endocarditis and a septic endocarditis associated with rheumatism, particularly when the person with rheumatic endocarditis shows a febrile recurrence, with signs of renewed involvement of the endocardium. There are undoubtedly cases which may be considered connecting links between pure septic endocarditis and what we commonly accept as rheumatic endocarditis. Münzer lays emphasis upon the fact that in the beginning of these cases cardiac symptoms are absent, and the diagnosis must be established upon a rise of temperature in the evening, which is later followed by an erratic course of fever, with chills, swelling of the spleen, sometimes definite symptoms of infarct, more or less pain in the joints, and hemorrhages into the skin and into the choroid. The most important diagnostic difficulty is always in distinguishing the cases from typhoid fever and malaria. The prognosis is bad, but always absolutely so.

Metabolism in Obesity.—A. JAQUET and N. SVENSON (*Zeitschrift für klin. Med.*, Band xli., Hefte 5 and 6) contribute a study of the metabolism in three cases of obesity. There has been much discussion as to whether there really exists any condition in which there is snboxidation of fats and obesity resulting from this. The existence of such a condition, though suspected, has not been proved. If the results reported in this paper are confirmed it apparently does exist. The authors found in consonance with other observers that the respiratory interchange in three obese subjects was normal during a period of temporary abstinence from food, but they lay stress upon the fact that when observed after taking food the respiratory interchange showed a much briefer and less pronounced increase than is customary in normal persons. This, they believe, is sufficient to explain the fat deposit. The reaction of the respiratory interchange to muscular exercise seemed to vary according to the condition of the other organs. In one case

it was normal or about normal; in two others a relatively slight increase in muscular exercise caused a marked increase in the consumption of oxygen. The use of thyroid was tried in these cases and a marked decrease in weight was produced. In the one series of studies the authors believe that they demonstrated an actual diuretic effect of thyroid extract, and they believe that in this case the loss of water was sufficient to explain the loss in weight. In other instances, however, there was an increase of metabolism and the oxidation processes seemed to be definitely increased after taking food, though there was not the same increase during abstinence.

Determination of the Species of Blood.—VON LEXERTH (*Deutsche med. Wochenschrift*, February 7, 1901) contributes some very interesting results which he has obtained in the effort to provide a method for the differentiation of various forms of blood. He injected rabbits with 10 c.c. of defibrinated cow's blood, making five such injections at intervals of about a week. He then made a perfectly clear solution of cow's blood in about one hundred parts of water, filtering off any deposits which formed. He introduced about 2 c.c. of this solution into small test-tubes and added an equal amount of 1.6 per cent. salt solution. A cloudiness resulted when the blood-serum of the rabbit was added to the solution. He considers it extremely important to use physiological salt solution in diluting and not mere water, as normal rabbit serum will become cloudy if introduced into a watery solution. He states that the results seem to be entirely specific, as solutions of a large series of blood from other animals caused no reaction. When, however, the blood of other animals or of human beings was originally injected into the rabbits whose serum was used in the test, the same reaction occurred with the special form of blood used, but with no other. He believes that in this way one may definitely tell human blood from other blood. The reaction was obtained from blood of various species that had been dried for weeks, dissolving it first in physiological salt solution.

Bacteriological Diagnosis of Typhoid Fever.—E. SCHOLZ and P. KRAUSE (*Zeitschrift für Klin. Med.*, Band xli., Hefte 5 and 6) contribute a study of some of the bacteriological methods now in use in the diagnosis of typhoid fever. Scholz discusses the Widal reaction and reaches the conclusion that it is of little value in early diagnosis. He ranges it among other symptoms of typhoid fever, all of which may at times be absent or appear only late in the disease. He believes that the greatest weight should be laid upon exact clinical observation of the whole course of the disease in distinguishing typhoid fever from similar conditions. The latter part of his observation is undoubtedly proper, but his observations concerning the Widal reaction were confined to the investigation of only 55 cases, 47 of which were positive and 8 negative. Among the positive cases there were 3 in which the reaction appeared only after five weeks. The series of 8 negative cases contained 2 in which the last test of the reaction was made on the ninth day; in 2 others the reaction was undertaken on the eighteenth and twenty-fifth days, but in the remaining 4 the test proved negative when undertaken between the sixty-second and the one hundred and sixth days of the disease. These observations, while of interest, are too few in number

to be compared with the large numbers of cases already reported, which show that the reaction is much more important than most other symptoms of the disease. Krause has studied the value of investigation of typhoid spots for bacilli. In 14 of 16 cases he obtained characteristic bacilli, and he considers this a more important method of examination than the Widal test, as five cases which showed bacilli in the spots showed no agglutination. He directs attention, however, to the fact that the bacilli may disappear from the spots within three to five days after the appearance of the spots, and that several spots should always be examined, as bacilli may be absent from some of them. He recommends making several moderately deep incisions into the spots and scratching the surface thoroughly when inoculating media from the spots. He admits that this method is of limited value as a diagnostic measure, because spots are absent in a considerable number of cases, other eruptions are readily confused with the typhoid eruption, the spots oftentimes do not appear early enough to be of great aid in diagnosis, and bacilli cannot always be obtained from them. [This method of examination, because of the technical difficulties connected with it, cannot ever prove as useful as the Widal reaction in the great mass of cases, as it is impossible to carry it out without fairly extensive bacteriological apparatus and the services of a bacteriologist of some skill, while the Widal reaction requires little apparatus, comparatively little special experience, and is less disturbing to the patient.] Krause has also studied Piorkowski's method of inoculating a urine-gelatin medium with the stools of suspected cases. He investigated 19 cases, making in all 123 tests. He found that in three-fourths of these instances the test was positive, while in four typhoid bacilli were not obtained. He thinks that this culture medium is a valuable addition to bacteriological methods, but that for diagnostic purposes the appearance of plate cultures alone are insufficient, and the bacilli must always be recognized by the usual chemical and biological measures. He found that this method could be more easily carried out, without waiting for urine to become alkaline spontaneously, if the urine were inoculated with the micrococci ureæ and kept in a thermostat for from twenty-four to forty-eight hours. The dilute gelatin used in this medium becomes fluid very easily, however, and the medium cannot be satisfactorily used in summer time.

Gastric Carcinoma.—E. JÜRGENSEN (*Deutsch. Archiv für klin. Med.*, Band lviii., Hefte 5 and 6) describes a case of carcinoma of the stomach in which it was notable that the HCl secretion was present until shortly before death and that there was marked variation in the daily amount of urine. At times practically no urine was secreted, and at such times there was marked tendency to somnolence, the reflexes were decreased, and the pupils were much contracted. The administration of large quantities of water per rectum and subcutaneously caused the disappearance of these symptoms coincidently with increase in the excretion of urine. The most rational explanation of the symptoms seemed to be poverty of fluids in the tissues. In another case of carcinoma there was marked fever of an irregularly remitting character. With the attacks of fever evidences of breakdown of the tumor were shown in vomiting of blood and increased pain and tenderness. The fever was attributed to the absorption of the products of

tumor destruction. In the periods in which the patient was free from fever the urine showed marked diazo-reaction and there was decided rapidity of the pulse. These symptoms were also attributed to absorption of toxic materials formed in the tumor destruction. RÜHMAYER (*Korrespondenzblatt für Schweizer Aerzte*, 1900, Nos. 21 and 22) discusses the clinical conditions in gastric carcinoma. Of 86 cases he found that 14, or 16 per cent., showed free HCl upon the first examination. This is somewhat higher than the percentage ordinarily given. Of these 14 cases 6 were certainly developed upon the basis of an old ulcer. In the other cases this question was in doubt. The free HCl was often found still present when the tumor had become large and even just before death. Distinct lactic acid reaction was obtained in 87 per cent. and Oppler-Boas bacilli were found in 80 per cent. In three cases the carcinoma was observed very early in life, during the fourteenth, nineteenth, and twenty-third years respectively. ROSTOKI, in an abstract of this article (*Centralblatt für innere Med.*, January 12, 1901, p. 52), stated that he had recently seen a case of carcinoma in a patient aged sixteen years. The case came to autopsy and the diagnosis was confirmed.

Mitral Stenosis without Murmur.—STRAUSS (*Centralblatt für innere Med.*, January 12, 1900) demonstrated to the Berlin Medical Society a case of mitral stenosis in which there had been no murmurs during life, but the diagnosis had been established. The patient was a glassblower, aged twenty-one years, who had had dyspnoea for years, with occasional hæmoptysis; he had no rheumatic history. His pulse was small and irregular, there was marked enlargement of the cardiac dulness, pulsation was visible in the third left intercostal space, and there was marked epigastric pulsation, but the cardiac sounds were pure. The reasons for making the diagnosis were irregularity of the pulse, with accentuation of the second pulmonary sound, marked epigastric pulsation, and circumscribed tenderness about the cardiac apex. The post-mortem showed an extremely high grade of mitral stenosis, with narrowing of the aortic orifice and some aneurismal widening of the pulmonary conus arteriosus.

A. FRAENKEL, in discussion, stated that he believed that the reason that aortic stenotic murmurs are likely to disappear shortly before death is that the energy of the heart action grows weaker. He spoke of a case of aortic stenosis in which there was a loud murmur two years ago. The patient recently died, the murmur being heard shortly before his death only as a soft, blowing sound at the apex. Autopsy showed a high grade of aortic stenosis.

Volvulus of the Stomach.—WIESINGER (*Deutsche med. Wochenschrift*, February 7, 1901) describes a highly interesting case of volvulus of the stomach, with complete occlusion of the cardia and pylorus and associated with acute fat necrosis, in which entire cure followed operation. The patient was a man, aged forty-one years, who, after a dietetic indiscretion, was taken suddenly ill in the midst of entire health. He had vomiting, constipation, pain, and distention of the abdomen. The vomiting in a short time became unproductive of anything but mucus. Any attempt to swallow was followed by immediate regurgitation. The patient was brought

to the hospital on the fourth day of his sickness; at that time there was a large mass in the upper portion of the abdomen. Operation was undertaken and the anterior wall of the stomach was found lying over the mass. The latter, from its cystic feeling, was thought to be possibly a pancreatic cyst. It was punctured and a very large quantity of fluid was drawn off (about 4 litres). It then became evident that the whole mass was the stomach distended with fluid and that the pancreas was entirely healthy excepting, perhaps, for some enlargement. The stomach was found twisted about 180° on its axis and fixed in this position through adhesions, the pylorus and cardia being completely occluded. There was beginning peritonitis. The stomach was replaced in proper situation and retained its position without any artificial aid. The man became entirely well and remained so. The case is especially notable for the entire cure of fat necrosis by operation. The fat necrosis was probably due to pressure of the distended stomach upon the pancreas itself or upon its main duct. The cause of the volvulus seemed to be displacement of the colon above the stomach, so that the partial fixation which this organ normally gives the stomach was absent. When a partial volvulus had come to pass this was undoubtedly largely increased by the distention of the stomach with the fluid secreted into it in such large amounts.

Hæmatemesis in Intestinal Stenosis.—L. ATIXIER and C. VIANNAY (*Gazette hebdom. de Méd. et de Chir.*, 1900, No. 77) direct attention to the rarity with which hæmatemesis has been mentioned as a symptom of stenosis of the intestine; it is not commonly discussed among the causes of gastric hemorrhage. It is, nevertheless, not surprising that it does occasionally occur. In the case reported by the authors the patient was admitted with the signs of severe intestinal stenosis, which laparotomy showed to be due to adhesions in the ileocecal region. These were overcome as far as possible and the patient improved temporarily, but after a few hours began to vomit again; the vomitus was black, had no fecal odor, and gave the characteristic reactions of blood. The patient died the next day after having vomited certainly as much as 2 litres of this black material within twenty-four hours. The stenosis was found to be about 50 cm. from the ileocecal valve, the intestine being fixed by adhesions and almost completely stenosed. Masses resembling the vomitus were found in the upper portion of the small intestine, while normal feces were found in the lower part. In the upper portion of the small intestine there was severe congestion and there was a hemorrhagic suffusion at the point of stricture. The occurrence of the hemorrhage was explained chiefly by the blood stasis produced by the stricture, which had caused an intense congestion of the intestinal mucous-membrane; the authors also consider that the irritation of the peritoneum had caused severe vasomotor disturbance, and that the toxic and inflammatory changes present had caused alteration of the vessel walls and of the blood. There was no sign of ulceration in this case, and the authors direct attention to the fact that hemorrhage has been seen in a number of similar cases in which no change was found in the intestine which directly localized the source of the hemorrhage. Hemorrhage in such cases makes the prognosis extremely bad. It indicates severe lesions as a result of the occlusion.

SURGERY.

UNDER THE CHARGE OF

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Treatment of Pott's Disease after the Development of the Deformity.
 —BRADFORD and COTTON (*Boston Medical and Surgical Journal*, September 29, 1900) state that the treatment of Pott's disease may be divided into two classes: (1) The treatment of the disease itself for the arrest and cure of a pathological process, and (2) the treatment of the deformity—that is, its correction or the prevention of its increase. The treatment of the disease itself consists in the proper fixation of the spinal column, either in a recumbent position in the acutest stage, or with thorough fixation and ambulatory treatment in the subacute and convalescent stage—that is, as soon as the slight jar unavoidable in locomotion may be permitted without fear of ill effect. The correction of the deformity: forcible correction has been attempted in 639 cases, with deaths from the operation in 5 cases, and death from some other cause in 20 cases. The immediate results were respiratory embarrassment in 7 cases, pain in 6 cases, and severe shock in 3 cases. Abscess was present before the operation in 19 cases; ruptured in 4 cases, benefited or absorbed in 6 cases, and appeared after operation in 2 cases. Paralysis was present before operation in 23 cases, relieved in 17 cases, not relieved in 2 cases, and made worse in 1 case. Paralysis appeared after the correction in 4 cases. The direct effect on the deformity in 240 cases was complete correction in 130 cases, incomplete in 94 cases. The result in 77 cases was no relapse in 20 cases, some relapse in 50 cases, and total relapse in 7 cases. The amount of force that may be used with safety varies with the amount of resistance and solidification of the affected bone. Correction treatment is admissible in the first of the stages only. The methods that have been employed in the correction by force are: (1) Vertical suspension from the head; (2) vertical suspension by the head and arms; (3) horizontal traction of the recumbent patient, with the pull upon the head, arms, and legs; (4) the same, with downward pressure upon the projection and support at the neck and hips, the patient lying upon the face; (5) traction with the patient lying upon the back; (6) downward pressure upon the pelvis and upper portion of the trunk, with upward resistance at the back at the point of maximum projection, the patient lying upon the back, with or without traction to the head and feet; (7) the patient lying upon the back, with upward pressure by means of a strap passed under the patient at the point of greatest projection, connected with a cord and pulley; (8) correction with

the patient seated, the upper portion of the trunk being stretched backward while the point of projection is passed forward at the knuckle and the pelvis secured by a strap. Experiments on the cadaver have shown that the correcting force to be preferred is that of pressure rather than traction, as the former is more precise in its effect upon the diseased tissue than a pulling force which is partly expended upon the secondary curves. A pulling force involves an unnecessary strain upon the neck and on the lumbar region which, when an anæsthetic is not employed, causes pain not essential to correction. A pressure force may be made to act more directly and with less waste. The method to be regarded as the best is that one in which the force applied can be more easily controlled by the surgeon and which can be employed with the least discomfort to the patient. That also is to be preferred in which the retaining jacket can be applied to a spine held in a corrected position with the least discomfort to the patient and the greatest facility to the surgeon. After correction of the deformity it is necessary to retain the spine in a corrected position until the gap made in correction is regained or supported by ankylosis. A retention appliance is quite as important as the correction itself, and it is necessary that careful fixation in a corrected position should be carried out for a long period. When correction is not possible for various reasons, either on account of the situation of the curve or on account of the pathological condition, the treatment by fixation of the trunk with appliances is to be employed, with the hope of arresting the development of the curve. The retention of the spinal column in the best possible position is, therefore, always important, even if correction has been attempted. When fixation treatment is neglected, even if satisfactory correction has been attained, a relapse of the curve will follow. After the tubercular process in the spinal column is arrested and complete bony ankylosis has occurred, it will sometimes be found that an increase in the curve may take place in the course of the growth of the child. This is not due to a continuation of the tubercular process, but to a change in the shape of the vertebrae, caused by the abnormal direction of superimposed pressure. The extent of these secondary curves and their development depend upon the rate of growth of the child and the amount of superimposed weight rather than upon a condition of osteitis. In order to overcome this it is necessary to continue the use of the mechanical appliances longer than the pathological condition would seem to demand. It has been shown that the main support in the diseased spinal column is in the articular processes. When these are welded together in connection with an ankylosis of the transverse and spinous processes, nature has furnished the most desirable support to a spinal column with diseased vertebral bodies. Attempts to promote solidification of these tissues naturally suggest themselves, but there can hardly as yet be said to be an established method of treatment. It may be said, in conclusion, that the correction or rectification of the curve in Pott's disease is to be considered in every case of active disease with a deformity. The employment of force should depend on the pathological conditions and not on the extent of the curve. Force should be used with great reserve. Improvement of the curve is to be considered in every case, and is to be attempted wherever the spinal column can be made straighter without great force. The main dependence, however, for an ultimate suc-

cess remains in the surgeon's careful, continued, and thorough employment of retention appliances which hold the spine in the straightest possible position for a sufficient length of time for consolidation of the diseased bony structures. Success is to be won more by careful attention to detail than by operative procedures.

Conservative Operations in Renal Retention.—KÜSTER (*Thirteenth Int. Med. Cong. Rome*, August, 1900) makes the following summary of his views:

1. There are two forms of renal retention.
 - a. Primary retention, the sacculated kidney, cystonephrosis.
 - b. Secondary retention, the empyema of the kidney arising from a pyelonephritis. It is unnecessary to speak of these, as they all require radical operation.

2. The name "sacciform kidney" comprehends all primary forms of retention due to the hindrance of the flow of urine without regard to their contents. This may be watery, urinous, purulent, viscid, or pasty. It is inconvenient to give to each of these a name, for they really comprise but one disease—cystonephrosis, of which certain varieties may have the names pyonephrosis, uronephrosis, etc.

3. The cause of the obstruction is situated in the ureter in all but a few exceptional cases. The most frequent seat of obstruction is in the upper third, and for this reason operative intervention should usually seek this point.

4. Renal retention should be treated conservatively, *i. e.*, with the preservation of the kidney, even when the other kidney is known to be intact.

5. The conservative methods can be divided into four groups:

A. Fixation of a movable kidney (nephropexy, Guyon). It is often necessary to combine this simple operation with others, as detachment of the ureter or plastic operations.

B. Formation of anastomoses between: 1, ureter and ureter; 2, pelvis and ureter; 3, pelvis and bladder.

These operations are satisfactory only when no dead spaces are left which may determine the formation of urinary calculi. Without such precautions the results are worthless.

C. Plastic operations with or without resection of the ureter.

1. Pyeloptychie (J. Israel).
2. Division of the valve and suture (Fenger).
3. Simple resection of the stricture and ureter. This should always be oblique, as this method is less liable to be followed by stenosis than the transverse.
4. Uretero-pyeloneostomy by the method of Trendelenburg and Küster.

D. Partial resection of the kidney.

- a. Resection of the renal pelvis followed by suture (Albarran).
- b. Wedge-shaped resection of the kidney parenchyma in cases of horse-shoe-shaped kidney.

FENGER (*Ibid*) summarizes his views on the subject as follows:

Remittent or beginning retention (and all retention is, in its early stages, as a rule, remittent) is a condition in which we should always consider the possibility of saving kidney tissue by re-establishment of the free passage of urine.

The obstruction may be located in the calyces, in a branch of the ureter, in the bottom of the pelvis, or origin of the ureter, or in the ureter.

Obstruction in the first two locations causes a local or partial cystonephrosis, and demands, for the relief of the condition, bisection of the kidney from its convex surface, and division of the partition walls.

Stenosis at the exit of the ureter (valve-formation, oblique implantation from unilateral dilatation) requires operations which vary in accordance with the absence or presence of stricture at the upper end of the ureter.

If there is no stricture at the upper end of the ureter, the valve-formation may be overcome by a trans-pelvic operation (Fenger, Mynter, Trendelenburg, Küster), or by the extra-pelvic operation, which he prefers.

If there is a stricture of the ureter at its exit from the pelvis, as may be expected in infected cases, we may resort to extra-pelvic plastic operation (Fenger), or to resection of the strictured end of the ureter, implantation of its upper divided end into the pelvis (Küster).

If the stenosis or obstruction is located in the ureter, it must be dealt with according to laws laid down for surgery of the ureter, namely, resection and re-implantation, or his plastic operation.

Are the results of these, so to speak, tentative conservative operations permanent, or does relapse eventually occur?

In five of his cases no relapse occurred.

1. Valve formation, transpelvic operation, no relapse six years later.

2. Stricture, upper end of ureter, extra-pelvic operation; no relapse six years later.

3. Valve-formation of lower branch ureter, extra-pelvic operation, bisection of kidney, division of partition walls; no relapse after three years.

4. Excision of valve in ureter by author's plastic operation; no relapse after three years.

5. Stone in upper end of ureter, removed by the author. One year later, plastic operation on the ureter by another surgeon. Six months later, complete occlusion of ureter at site of second operation; author's plastic operation; no relapse after one year.

In two cases relapse occurred:

1. Valve-formation without stricture, intra-pelvic operation, relapse of stenosis, occlusion of pelvic orifice; nephrectomy one year later.

2. Patient operated on by another surgeon, later on by the author; operation was incomplete, failed, and nephrectomy was finally necessary.

BAZY (*Ibid.*), in discussing the same subject, defines the condition of renal retention as the constant presence of urine in the pelvis or calyces of the kidney, which is the result of an interference with its flow. The obstruction may be found anywhere between the origin of the ureter in the pelvis of the kidney and its vesical insertion, or it may be due entirely to a vesical cause.

The obstructions of the ureter, which alone are considered, are found anywhere in its course, and consist of strictures, twists or vicious insertions, and calculi.

1. Twists are generally, if not exclusively, found in the upper third of the ureter. They are associated with movable kidney and vicious insertions of the ureter in the renal pelvis.

2. Calculi may be found anywhere in the ureter, but the point of election is at one or other extremity.

3. Strictures may be found at all points of the ureter, but they are more frequently above or below.

These strictures may be due to lesions of the ureteral wall or to inflammations of neighboring organs and cicatricial tissue forming there and by its contraction, producing the stenosis.

Such strictures are always present in cases of uretero-vaginal fistula—an important point.

Renal retention may be intermittent, remittent, or continuous. The first two are due to vicious insertion and movable kidney or a calculus. Continuous retention, or even permanent, is caused sometimes by calculi, but more commonly by strictures, the action of which is progressive and permanent. The final stage is a hydronephrosis or pyonephrosis.

Finally, the retentions may be aseptic or septic. The aseptic are hydronephroses. The septic are the infected hydronephroses or pyonephroses.

Conservative operations are indicated only when the kidney has functional utility and is not a source of danger. The indications are most exact in pure hydronephroses, they are less clear in cases of infected hydronephrosis, they are absolute in cases of unilateral kidney, no matter what the condition.

The treatment varies with the condition. Calculi should be removed by nephrotomy, ureterotomy, or by vesico-ureteral or vagino-ureteral operation. Twists heal spontaneously or by nephrorrhaphy. Abnormal implantations are operable by uretero-pylonec-tomy. These operations are primary and secondary, depending on the presence or absence of infection. There are various methods that differ slightly from one another. Resection of the renal pelvis should be confined to pure hydronephroses without infection. Aseptic operations may be done by either route. Septic operations (pyonephroses) should always be done by the lumbar route.

In all cases it is absolutely essential to overcome all strictures.

Infection of the ureter and renal pelvis is not a contraindication to operation. Abscess of the kidney is, however, a contraindication to all anaplastic intervention.

The results of the past seven years justify these conclusions.

Experimental Injection of Testicular Fluid to Prevent the Atrophy of the Prostate Gland in Dogs after Removal of the Testes.—WALKER (*Bulletin of Johns Hopkins Hospital*, December, 1900) states that it is now a well-known fact that the prostate gland undergoes an atrophy after the removal of the testes, and these changes have been most accurately studied by several investigators, whose observations the author has confirmed in several instances. These may be summarized thus: Twelve days after the removal of the testes there can be seen a beginning change in the epithelial cells of the prostate gland; the protoplasm first begins to clear up and the nuclei lose their chromatin structure and diminish in size. Following this the protoplasm becomes gradually less and less, and finally at the end of about six weeks it presents only a faint rim around a small, deeply stained nucleus. The bloodvessels, which at first were large and turgid, very soon begin to shrink, and finally many of them are obliterated; the muscle

undergoes fatty degeneration and is ultimately converted into or replaced by fibrous tissue. After a period of from eight months to one year the gland is reduced to about one-fourth its normal size; the glandular structure is represented by only a few small tubules lined by shrunken and quiescent cells, and the remainder of the gland is converted into fibrous tissue. The result may be summed up in a few words: The prostate gland in the infected animals presented both macroscopically and microscopically the same changes that had occurred in the uninjected ones. It may be said, therefore, that the injections of the testicular fluid had apparently no effect whatever, and one is probably justified in concluding that the atrophy of the gland is in no way connected with the absence of any substance in the testicular secretion.

Cholelithiasis from the Surgical Point of View.—SMITH (*Buffalo Medical Journal*, January, 1901) states that it is known that the colon bacillus is pus-forming, and under favorable circumstances, especially when mechanical interference with the biliary flow arises, it may lead to suppurative cholecystitis and empyema of the gall-bladder. Other infectious organisms, according to recent investigations, are found to lead to pus formation in the biliary tracts. When local conditions or the character of the bacteria lead to an infection of the catarrhal inflammatory type in the bile tracts, suppuration does not take place, but the deposit of cholesterol and bile salts about a focus of bacterial activity leads to gallstone formation. The colon bacillus and the typhoid bacillus have lately been found by numerous observers as the basis of biliary calculi. When we consider cholelithiasis from this pathological point of view the treatment is put upon a broad surgical plane that leaves to internal medicine the close study of the subject from the diagnostic stand-point with a view to the course to be followed in treatment. Treatment should be pursued along medical lines after diagnosing cholelithiasis to the point of determining that its manifestations are threatening to the patient from the element of sepsis, or of mechanical interference with the biliary flow, or the conjunction of these two elements. Internal medicine should then call upon surgery to drain for sepsis and to afford mechanical relief to mechanical interference with the biliary current. In conclusion, it seems that the indications for operative treatment of cholelithiasis can be summed up under two headings: In the first place, operate for biliary calculus obstruction along the bile tracts, which has in its train of sequelae recurring colic, hydrocholecyst, persistent jaundice, and cholemia; in the second place, operate for sepsis of the bile tracts when it develops such dangerous conditions as suppurative cholangitis, suppurative cholecystitis, or perforation of the duet or cholecyst. In both classes of cases suffering and death are to be dreaded, in the majority of cases more from the disease and its sequelae than from the surgeon's knife.

A Contribution to the Diagnosis of Suppurative Appendicitis.—ROBINSON (*Medical Record*, October 27, 1900) states that a white blood-count will often swing the pendulum in the direction of the diagnosis of one disease or another. Especially is this true in cases of suppuration complicating an infectious or inflammatory disease. Thus a sudden hyperleucocytosis in the

course of typhoid fever will point to a complication, and if accompanied by a sudden onset of pain in the abdomen will be a sufficient justification for an exploratory incision. A hyperleucocytosis will at once differentiate a suppurative appendicitis from simple colic, typhoid fever, ovarian neuralgia, impaction of feces, and floating kidney. Developed during the course of a catarrhal appendicitis it will point to suppuration with as much precision as any of the diagnostic signs in our possession. The following cases of appendicitis show the relation of suppuration and hyperleucocytosis:

No. 1. 52,000 leucocytes; pus formed on operation.

No. 2. 19,000 leucocytes; pocket of pus found.

No. 15. 22,300 leucocytes; abdomen full of pus.

No. 17. 21,000 leucocytes; pus; cecal abscess.

No. 18. 47,700 leucocytes; second operation; pus.

No. 18. 36,300 leucocytes; third operation; pus.

No. 23. 20,000 leucocytes; operation; pus.

No. 28. 19,000 leucocytes; purulent peritonitis.

No. 31. 17,500 leucocytes; pint of pus.

No. 31. 16,200 leucocytes; abscess cavity.

No. 40. 32,800 leucocytes; large amount of pus.

No. 50. 17,000 leucocytes; pus.

No. 51. July 6th, 11,500 leucocytes; slight tenderness, no resistance or dulness.

No. 54. July 7th, 19,000 leucocytes; resistance and tenderness; operation, pus.

The last case shows how by means of a blood-count pus can be detected in twenty-four hours and a fatal case be thus converted into a very favorable one, and it appears rational, therefore, that a frequent blood-count in cases of appendicitis is almost an imperative necessity.

The Importance of Early Operation in Gallstones.—RICHARDSON (*Journal of the American Medical Association*, December 1, 1900) states that gallstones should be removed from the gall-bladder as soon as their presence is reasonably sure unless the diseased condition of the other viscera makes the hazard of the operation greater than the hazard of the gallstones themselves. The author has observed that the earlier the operation the less danger and the greater success. The removal of gallstones from a normal gall-bladder is without mortality, and he has yet to lose a case after the simple removal of gallstones from a normal gall-bladder. Operations on the cholemic are attended by a relatively high mortality. In this class of cases the operation has often to be performed on the common duct, where the dissection is broadest and deepest and the patient's power of resistance feeblest. The significant and unfavorable factor, however, is the jaundice and not the dissection, for an even larger percentage of deaths has followed simple exploration for malignant disease blocking the biliary passages than has followed simple operation for gallstones in prolonged jaundice. All of the author's cholecystotomies have been successful. The fatal operations of this class have been cholecystotomies with removal of stones from the hepatic and cystic ducts through the gall-bladder. Considering the gravity of the acute infections of the gall-bladder, this class of cases has been

most brilliant, for nearly all the patients have recovered after simple drainage. The results of experience can but emphasize the importance of early operations. In most of the author's fatal cases the history of gallstones had lasted over many years—a period of time during which serious complications, both local and general, had taken place. Moreover, in many cases the patients were beyond middle life, and one patient at least was of advanced age. Among the deaths were four occurring during the course of an acute cholecystitis. In some of the successful cases, too, similar serious local and constitutional conditions existed, but in spite of them recovery followed. Patients of middle age, or younger, without these complications were all cured by operation, and thus far the cure has been permanent. Among the serious complications were acute infections of the gall-bladder in some twenty cases. All recovered except four. In many of them there was no history of gallstones; in several appendicitis was supposed to exist; in a few no gallstones were found; in two the operation was undertaken as a last desperate hope. The possibility of the occurrence of acute cholecystitis is another strong argument in favor of early operation. Though comparatively rarely seen in the acute stage, the author is sure that many of the contracted gall-bladders have passed through successive mild infections.

What are the indications, then, for operations on gallstones? In the author's opinion, the indication is the diagnosis of gallstones in the gall-bladder. When this diagnosis has been made the gall-bladder should be explored if there is no contraindication in other viscera. A single attack of gallstone colic after which a faceted stone is found in the stools indicates operation, but a single attack after which a single non-faceted stone is found does not. Repeated attacks of severe colic, even if stones are not found in the stools, strongly indicate exploration, especially if there is tenderness in the gall-bladder, with fever, for stones are probably confined in the gall-bladder or at its outlet, and the spasms are ineffectual efforts of the gall-bladder to expel them. All cases of acute cholecystitis demand operation if seen early unless the symptoms are rapidly improving, and then they require operation after the subsidence of the acute attack. Repeated attacks of gallstone colic indicate operation, even if no stones are discovered in the stools and even if the symptoms are so mild as not to demand it. True conservatism in the surgery of the gall-bladder—the lesions of which are purely mechanical—requires, as the only rational treatment, surgical measures which themselves are purely mechanical. Though natural relief in gallstones is not as impossible as in stones of the urinary bladder, the former, because of their occurrence, cause far more suffering and death than do the latter. Furthermore, the complications of gallstones are in many instances quite as disabling as those of urinary calculi, and they often are more rapidly fatal. A most pernicious argument against surgical measures in gallstone affections, as in appendicitis, is the occasional quiescence or apparently complete recovery after severe symptoms, but one can never predict the probable course. Removal of the appendix that has offended or is offending is the only common-sense method of treatment, as most experienced operators and clinicians will admit, the chief difference of opinion being as to the safest time for operation; so in patients who have suffered from gallstones—who are suffering

from them—it is, but common-sense to advise simple and safe methods of sure removal rather than the uncertain and dangerous courses of natural evolution. In both diseases early operation, at a period when everything favors speedy convalescence, can but be regarded, in the light of experience and of common-sense, as a life-saving procedure gained at a minimum of risk.

PEDIATRICS.

UNDER THE CHARGE OF

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A Comparison of Drug Values in the Treatment of 752 Cases of Pertussis.—CHARLES G. KERLEY (*Proceedings New York Academy of Medicine, Section on Pediatrics*, February 8, 1900; *Pediatrics*, May 1, 1900) presented a paper under this title. The cases were separated as they developed into groups of twenty, and were allowed to cough without treatment until the height of the paroxysmal stage was reached, which usually required from ten to fourteen days. Five-sixths of the patients were under four years of age, and one-half under two years. The duration of the attack had varied between three and twenty weeks, the usual duration having been between six and eight weeks. Resorcin and boric acid with sodium bicarbonate were tried by insufflation in six institution cases, but were discontinued after three days. Alum, fluid extract of horse-chestnut leaves, dilute nitric acid, cocaine, bromoform, bromides, belladonna, and antipyrine had all been tried. The first three had been found valueless; alum appeared to be of some service, but had been badly borne by the stomach; bromoform had proved very unreliable. Cocaine in doses of one-tenth of a grain every four hours for a child of two years had been employed in about twenty-five cases. It had controlled the severity of the paroxysm somewhat, but not sufficiently to warrant its continuance.

Quinine in large doses (twelve to twenty grains daily) had produced great benefit, the number and severity of the paroxysms being remarkably controlled and diminished one-half or one-third. Belladonna had been used in sixty cases, pushed to its physiological effect, but no beneficial effects had been observed. Twelve to sixteen grains a day of a mixture of equal parts of the bromides of sodium, ammonium, and potassium, at the age of one year, gave better results than were obtained with the previously mentioned drugs.

Antipyrine had been used in sixty cases, and had controlled the paroxysms better than any other drug employed, and caused only a trifling depression if

administered with ordinary care. The combination of bromides with antipyrine had been used in sixty cases, with better results than from one or other of these drugs independently. For a child of eight months half a grain of antipyrine and two grains of sodium bromide should be given every two hours for six doses, and then its administration should be discontinued for twelve hours before being resumed. For a child between two and a half and four years of age, two grains of antipyrine and three or four grains of bromide should be given every two hours for twelve hours, and then discontinued for twelve hours before being resumed. The steam spray and fresh air were also useful adjuncts to the drug treatment.

Treatment of Pertussis by Oil of Gomenol.—LEROUX and PASTEAU (*Le Bulletin Médical*, June 13, 1900) speak favorably of the use of an oily solution of gomenol, which is an essence obtained by distillation from a variety of *melaleuca viridiflora*, grown in New Caledonia. From 5 to 10 c.c. of a 5 per cent. oil were injected into the gluteal muscles. The results of treatment in forty cases were generally favorable, the frequency and severity of the paroxysms being shortened and the duration of the disease reduced on an average to twelve to fifteen days. Treatment should be continued for four or five days after the last seizure.

The Acute Non-tuberculous Meningitis.—A very complete report upon this subject was recently made by CONCERTI, of Rome, to the Thirteenth International Medical Congress (*Revue mensuelle des Maladies de l'Enfance*, August and September, 1900, p. 394, and November, 1900, p. 550). It is based upon ninety cases of non-tuberculous meningitis and upon thirteen cases of poliomyelitis, most of which were exhaustively studied. Autopsies were obtained in twenty-two cases, and fifty other cases of various conditions, such as hydrocephalus, tuberculous meningitis, cerebral and rhachidian tumors, tetany, etc., were studied by way of comparison. At least 450 lumbar punctures were made. The conclusions of this very important study are worthy of attention:

1. A series of twenty-three cases of acute meningitis. These developed most often in the course of a gastro-intestinal infection or of a pneumonia or other acute infectious disease, more rarely in the midst of perfect health. They are characterized by an abundant exudation of cerebro-spinal fluid of limpid clearness and increased specific gravity, which is richer in albumin than normal and sometimes shows the formation of a fibrinous reticulum (the phlogistic exudate), but contains no trace of micro-organisms. The exciting cause is attributed to toxic elements. The term acute serous meningitis should be restricted to cases of this character.

2. In another series of twenty-one cases the meningitis most frequently developed primarily or, more rarely, in the course of another disease (pneumonia, intestinal infections, or typhoid) and was caused by various known organisms. The cerebro-spinal fluid may be perfectly limpid, clouded, or even purulent, and contains a much higher proportion of albumin than normal—1 to 2 per cent. At autopsy the meninges are scarcely affected, or may show varying degrees of fibrinopurulent exudate, which in the extreme cases may be very extensive and thick. Limpidity of the liquid

exudate in these cases does not justify the term acute serous meningitis, which should be reserved for the purely toxic cases of the first group. The most frequently encountered micro-organisms are the pneumococcus and the diplococcus intracellularis (meningococcus), but in rarer cases have been found the bacterium coli, the Eberth bacillus, streptococci, staphylococci, the bacillus pyocyaneus, the bacterium lactis aerogenes, or others. With the exception of the streptococcic or staphylococcic cases, in most of these meningites the cerebro-spinal fluid is limpid. The cerebro-spinal fluid does not furnish a good culture medium for micro-organisms, especially the meningococcus, which tends to die out and disappear. The pneumococcus determines the most serious and rapid cases, especially if it coincides with pneumonia (metapneumonic meningitis), but it may determine primary meningites of the same type. It is only exceptionally that benign forms are encountered.

3. Meningites produced by the meningococcus are almost always primitive (perhaps of nasal origin), have a much longer course, are almost always of intermittent type, and have a tendency to recovery in the majority of cases. The varieties of the meningococcus which have been described (Weichselbaum, Jäger-Henbner) are only modifications produced by varied conditions under which they develop.

4. Acute meningites, whatever their nature, which do not destroy rapidly (excepting the exceedingly benign forms), tend to a prolonged course lasting several months or even as long as a year, especially those due to the meningococcus, and may terminate in death in a profound state of atrophy, or in recovery which in most cases is incomplete, leaving as a result hydrocephalus, amaurosis, deafness, or various palsies.

5. All the causes above considered, whether bacterial or toxic, may act in the same manner upon the nervous tissue itself, or upon it at the same time as upon the meninges, and produce poli-encephalites, poliomyelites, or meningomyelites, which should be considered as processes due to the same pathogenic cause, distinct only in special cases because of the quality of the causal element and of the localization.

6. Lumbar puncture constitutes an excellent means of diagnosis and sometimes of prognosis. It is also a powerful therapeutic agent if practised at an early period of the disease and continued with more or less frequency according to the gravity of the case. Under these conditions puncture seems to prevent extreme prolongation of the course and unfortunate sequelæ.

7. On the contrary, in other forms—e. g., tuberculous meningitis—puncture is useless either for diagnosis or as a therapeutic measure. The same may be said for its use in chronic congenital hydrocephalus and cerebral tumors. Good results, however, can be obtained in tetany, hemorrhachis, and, according to some authors, in chorea.

Indications for Lavage of the Stomach in Nurslings.—HEUBNER (*Revue mensuelle des Maladies de l'Enfance*, November, 1900, p. 575) defines the indications for lavage of the stomach in the gastro-intestinal diseases of infancy. Under certain conditions this procedure produces little or no effect, as, for instance, with chronic gastro-intestinal lesions associated with

more or less pronounced athrepsia. Here lavage of the stomach gives no appreciable results, for it can combat only one of the many factors which enter into the case. The same may be said of cases of acute dyspepsia which begin not with gastric, but with intestinal symptoms, such as colic, meteorism, and green stools. Evacuation of the stomach cannot eliminate the harmful substances, and the same may be said of cases in which there is a grave inflammatory state of the large or small intestine.

Quite different is a condition of acute indigestion encountered in artificially fed children suddenly seized with repeated vomiting, anorexia, and signs of collapse, since in these cases there exists frequently a certain sluggishness of the stomach preventing the onward passage of the food. The intestine is protected, for some hours at least, from infection by the decomposing stomach contents, so that evacuation of the stomach by means of the tube, with subsequent lavage, brings about a rapid cure and prevents intestinal disturbance. These conditions in the infant constitute the chief indication for lavage of the stomach. Neither emetics nor purgatives are by any means so satisfactory; the former add to the general depression and the latter favor the progression of decomposing food into the intestine.

In the technique two precautions are necessary: the fluid used should always be a physiological solution of sodium chloride or a solution of sodium bicarbonate of the strength of 0.7 per cent., appropriately warmed. Pure water should never be employed, since it acts unfavorably on the epithelium of the stomach. The pressure should not exceed that of a column of water 20 cm. in height.

The Abortive Treatment of Pneumonia in Infants and Children.—II. ILLOWAY, of New York (*Pediatrics*, December 15, 1900, p. 442), asks the question, Can a pneumonic process in the infant or child be arrested at its outset—aborted? He then refers to the old-fashioned theory of jugulation, which held an important place in the practice of physicians of the past generation. From his own experience he answers the question affirmatively and proceeds to report a number of cases of both catarrhal and croupous pneumonia bearing out his statement. The first case was one of bronchopneumonia in an infant, aged nine months, which began after a bronchitis, with slight fever, lasting five or six days. The temperature then rose and for two days ranged from 102° to 102.75° and from 103° to 104°. On the morning of the third day, with a temperature of over 103°, considerable diminution of resonance in the right lower lobe posteriorly was detected. The child lay in a stupor, from which it was aroused only by cough. At this stage of the disease three-fourths of a drop of tincture of veratrum viride and one-fourth of a drop of tincture of aconite were given every hour and a half. By evening the temperature had fallen to 100° and the baby had begun to nurse well. Next morning the temperature was normal and rapid recovery followed; the cough continuing for ten days longer, growing less and less frequent and at the end of that time ceasing altogether. The second case occurred in a girl, aged eleven years, in whom the author had observed two previous attacks of bronchopneumonia, both of which lasted for more than three weeks. At the third attack the physical signs gave promise of more extensive involvement of the lung than occurred in either

of the two preceding attacks. The treatment here was the administration of three-fourths of a drop of Norwood's tincture of *veratrum viride*, with one-fourth of a drop of tincture of aconite, given at intervals of half an hour for five doses and then hourly. This dosage was continued from morning until evening, and by this time the child was so much better that the interval was made every two hours, and during the night the medication was omitted. On the following day the temperature was normal. All signs of bronchitis disappeared in seven days. Two other cases—one of bronchopneumonia, the other distinctly erysipelas—were treated successfully in the same way.

A second class of cases is described in which the infusion of digitalis (a decoction as prepared by German pharmacists, 10 grains to the ounce) seemed to act satisfactorily.

The author believes that the combination of aconite and *veratrum viride* acts directly upon the main factors in the morbid process—congestion and inflammation—is shown by the fact observed that the temperature was reduced permanently without subsequent rise even after the medicine was stopped. He considers the repetition of the remedies at short intervals to be of the utmost importance.

[It is a well-known fact that pneumonic processes in the child often terminate spontaneously after a course of only two or three days, so that conclusions based upon only a few cases, however treated, must be accepted with caution. Dr. Howay's cases, however, are very suggestive and at least indicate that this combination of drugs can be used without harmful results. One of the editors of this department has frequently employed at the outset of pneumonia in children a combination of tincture of aconite and tincture of digitalis during the first twenty-four hours, with very encouraging results, which lend support to Dr. Howay's contention.—T. S. W.]

THERAPEUTICS.

UNDER THE CHARGE OF

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Urotropin as a Urinary Antiseptic.—DR. P. J. CAMMIDGE has given very careful study to the action of urotropin in the urine, especially in relation to its antiseptic action on the bacillus coli communis, the bacillus typhosus, and pyogenic cocci. He finds that in strong solution it is markedly toxic to the typhoid organism and less so to the colon bacillus and staphylococcus; in weak solution it inhibits growth only. The causes for

its antiseptic action were investigated, with not altogether definite results. It has been supposed that it breaks up into formaldehyde, but on this point the experiments are summarized as follows: (1) Urotropin alone by prolonged heating may be made to yield formaldehyde, but this decomposition does not take place at body temperature; (2) an alkaline solution of urotropin may be similarly decomposed, but the body temperature is not sufficient to cause the change; (3) dilute acids quickly decompose urotropin on boiling, with the evolution of free formaldehyde, and this change occurs to a slight degree at the body temperature; (4) acid salts—*e. g.*, of the urine—liberate formaldehyde from urotropin on boiling, but not at the normal body temperature; (5) the acid urine of a person taking 2 grammes (30 grains) of urotropin a day does *not* contain free formaldehyde. There is no doubt that there is an antiseptic in the urine, but it is evidently not free formaldehyde. It is possible that a new compound is formed with acid urine. Typhoid cystitis, suppurating pyelitis, and pyelitis from calculus, as well as simple colon infection of the bladder, are happily acted on, but gonorrhœal and tuberculous cystitis do not seem to be benefited. In using urotropin it is essential that the urine be rendered acid.—*Lancet*, 1901, vol. clx., p. 176.

Cobra Poisoning Treated with Antivenene.—DRS. W. HANNA and GEORGE LAMB, working in the Bombay research laboratory, report an instructive case. One of them was bitten, during experimentation, by a full-sized cobra and an appreciable amount of venom thrown into the operator's thumb. Local treatment was confined to sucking the thumb freely. Twenty minutes after the accident 4 drachms of Calmette's antivenomous serum were injected, half into each flank. This serum was four or five years old, and experiments made on rats a few weeks previous showed that it possessed one-fourth of its normal neutralizing power. Two and one-half hours after the patient was bitten symptoms of cobra poisoning set in; these were, at first, disinclination to work and lethargy, then followed nausea and vomiting, accompanied by slight paresis of the legs. Fresh serum was then obtained and two teaspoonfuls used. The nausea and the weakness of the limbs continued for some time, and at the expiration of about five hours all symptoms had passed away. The favorable result is attributed to the use of the serum even after general symptoms had made their appearance.—*Lancet*, 1901, vol. clx., p. 2.

Selenium as a Toxic Agent—DRS. F. W. TUNNICLIFFE and O. ROSENHEIM speak of the difficulties in the way of ascribing all of the cases of neuritis in the recent Manchester epidemic to the action of arsenic and suggest that perhaps selenium, which is highly poisonous and an invariable accompaniment of pyrites, is responsible for some of the symptoms. Its part, however, is purely subsidiary to that played by arsenic.—*Lancet*, 1901, vol. clx., p. 318.

Arsenical Poisoning in Beer.—DR. W. B. WORRINGTON makes some comments on symptoms seen during the epidemic of arsenical neuritis in Manchester. Sensory disorders seem to have been out of all proportion to

the amount of beer or stout consumed. The most obtrusive phenomena were: (1) Numbness and tingling, which came on rapidly, in both hands and feet. In some a painful sense of a burning character in the soles of the feet, making walking undesirable, was all that was noted. (2) Pain, often most acute on pressing the soles of the feet, especially at the heel and ball of the great and little toe. In nearly all cases the pain on moving the joints was excessive, and especially so on pressing the muscles; this latter symptom was also noted in a number of cases in the forearm muscles. (3) Several of the patients showed a flushed appearance of the sole, especially at the great toe and heel, rarely spreading on to the dorsum of the foot, and associated with pain, making the picture of erythromelalgia, but the swelling, which when associated with pain and redness is described as typical of erythromelalgia, was seen in but one case. (4) Objective impairment of sensation was absent. (5) The knee-jerks were often present and at times unusually brisk.—*British Medical Journal*, 1901, No. 2088, p. 10.

Toleration of Arsenic.—Some observers have maintained that it is possible that the picture of arsenical poisoning from beer at Manchester was a trifle overdrawn, and Dr. R. W. MACKENNA, of Liverpool, has collected a series of statistics from the Liverpool Skin Hospital bearing on the tolerance of arsenic in which he shows that, for Donovan's solution at least, patients can take 0.400 grain of arsenious iodide daily for months without untoward effects. According to these figures, an ocean of Manchester beer would have to be consumed in order to induce toxic effects. The arsenic eaters of the Tyrol are classical proofs of the toleration which may be enjoyed. It may be that the combination of arsenic and alcohol has a particularly pernicious effect, either as a result of their combined toxic actions, or because of some chemical interchange between the menstruum and the salt whereby the toxicity of the latter is increased.—*British Medical Journal*, 1901, No. 2089, p. 85.

Treatment of Rheumatic Fever.—Dr. ARTHUR P. LUFF, as a result of his experience, believes that rheumatic fever is most successfully treated by giving an alkaline bicarbonate in combination with a salicyl compound. Twenty grains of sodium salicylate and 30 grains of potassium bicarbonate should be given every two hours until the pain is relieved and the patient is fully under the influence of the drug, when the same quantities should be given every four hours until the temperature has become normal. Later, 15 grains of the salicylate and 20 grains of the bicarbonate should be given every four hours until all joint symptoms have disappeared and then three or four times a day until two weeks have elapsed. Absolute rest in bed must be enforced throughout. The statement is made that larger doses of the natural salt than of the synthetic product can be borne by the patient, hence the natural salicylic acid should be specified. If the sodium salicylate is not well borne, salicin may be employed advantageously. If after the expiration of twenty-four to thirty-six hours the joints are painful, small blisters applied above and on either side of the joint will, as a rule, rapidly remove the pain and the swelling. Tincture of iodine about the joint is also recommended. The use of oil of wintergreen—methyl salicylate—is still

more efficacious as a local application. For the relief of general pain, opium, as Dover's powder, or the newer analgesics, phenacetine, etc., may be employed. Brandy is indicated as a heart stimulant, being especially important in cases complicated with endocarditis, pericarditis, or myocarditis. Especial stress is laid on the fact that the disease is rarely cured within four or six weeks, and hence great care must be exercised by the attending physician that the patient, relieved of pain, is not permitted to move about. The patient has latent rheumatism, and even the mildest exercise is apt to induce a relapse, which is usually attended with cardiac complications. This caution is to be particularly observed in treating children. The probability of mild cardiac involvement in almost every case should be borne in mind, and hence the heart should receive careful attention. Opium is of great value in the early stages of endocarditis or myocarditis or pericarditis, and strychnine and ammonium carbonate seem more available than digitalis when there is dilatation and failing cardiac power. Ice-bags, leeches, and opium are trustworthy remedies for pericarditis. Hyperpyrexia seems to be less prevalent under modern methods of treatment, but in those that do not respond to the salicylates, hydrotherapeutic procedures are advisable.—*Practitioner*, 1901, vol. lxvi., p. 64.

Treatment of Pneumonia.—DR. THOMAS R. BROWN, after a short review of the various shifting modes of treatment of this disease, says that the failures of the past should not be forgotten, and that no line of treatment should be followed in which the good does not definitely outweigh the bad. Pneumonia is not a disease of the lung solely, but also a general toxæmia, and thus in discussing the subject the possibilities of direct and indirect treatment should be considered. The early work of the Klemperers gave much encouragement to the hope of the probable efficacy of an antitoxin; thus far, however, the results have been problematical, but the attitude at the present time is promising. As to the advances along the indirect or symptomatic mode of treatment, the author believes that the best results are obtained by careful nursing, diet, hygiene, and by the systematic use of hydrotherapeutic measures during the entire course of the disease, cold sponging and cold packs being more practical than the full tub. Saline infusions are to be employed in the patients who have faint heart sounds and a weak pulse. One or two pints should be used. Inhalations of oxygen or medicated oxygen vapors are valuable in extreme cases. Morphine for pain, alcohol and strychnine for stimulation, are the most reliable drugs. Caution should be taken that thorough disinfection of the sputum is carried out.—*Maryland Medical Journal*, 1901, vol. xlv., p. 1.

Treatment of Arsenical Neuritis.—DR. JUDSON S. BERRY, of the Manchester Infirmary, has had exceptional opportunity to see numerous patients by reason of the recent epidemic of arsenical poisoning at Manchester. Heretofore some seventy to eighty cases were on record, but this epidemic affected thousands. In the treatment followed at the infirmary the absolute withdrawal of the cause—arsenic—was enforced, both because of the arsenic and the alcohol. Rest in bed is advisable. Massage is distinctly contraindicated. For the relief of the pain hot fomentations are excellent. These are

best applied intermittently—a fomentation being placed on the affected part for one-half hour and then re-applied after a lapse of four hours. Vapor baths are of value if the heart's action is not affected thereby. Potassium iodide and the salicylates, alone or in combination, are effectual, and the newer analgesics, antipyrine and phenacetine, are valuable in many cases. Strychnine should never be used in the acute stages. The importance of careful nourishment was demonstrated forcibly. Boiled milk, beef-tea, beef extracts, broths, and soups are valuable. Peptonized foods are indicated for gastric irritability, and at times are nutrient. Hematins are necessary. After the acute stage is over massage, electricity, and tonics are efficacious. Cod-liver oil and strychnine are useful, but arsenic is to be avoided.—*British Medical Journal*, 1930, No. 2051, p. 1629.

Epilepsy.—Dr. C. WICKEL has proposed a modification of the Flechsig opium treatment for this affection. The patient is started on one grain of opium three times a day. On the third and fifth days there is an increase of one-fifth grain with each dose and a similar increase every second day thereafter until the fifty-first day, when the patient is taking fifteen grains of opium in twenty-four hours. On the next day the patient is given ninety grains of mixed bromides. This dose is increased fifteen grains a day until a total of one hundred and thirty-five grains is reached. The patient continues to take this for a couple of weeks.—*Berliner Klin. Woch.*, 1900, No. 48.

Coffee and the Nervous System.—Dr. W. M. LESZYNSKY maintains that ill effects following the use of coffee are by no means uncommon. Much of the present-day nervousness he attributes to its immoderate use. The symptoms complained of are general headache and nervousness, apprehension regarding the future, mental depression and irritability, insomnia or restless sleep, bad dreams, sudden awakenings, vertigo, general tremulousness, diminished muscular power, loss of appetite, frequent eructation, and constipation. Objective symptoms, in addition, are coated and tremulous tongue, tremor in the eyelids when standing with closed eyes, in some cases dilated pupils, tremor in outstretched hands, rapid pulse of low tension and frequently irregular, ranging from 90 to 130, exaggerated reflexes, and a varying amount of reflex irritability. For the treatment of the condition it is wise to limit the patient to one cup of coffee in the morning or to substitute one of the cereal coffees. A useful mixture, to be used as a sedative, is the following: Sodium bromide, fifteen grains; solution of potassium arseniate, two minims; compound tincture of gentian, one-half ounce; fluid extract of kola, fifteen minims. At the end of five or six weeks the bromide should be discontinued and tonic pills containing arsenic, quinine, and strychnine taken. Recovery should follow in from three to six months.—*Medical Record*, 1901, vol. lix., p. 45.

Yohimbin: A New Aphrodisiac.—Dr. L. LÖWY reports on the alkaloid or mixture of alkaloids obtained from the bark of a number of the Rubiaceæ. They exert a marked effect on the vascular supply of the genital organs. Thoms has given the formula $C_{23}H_{32}N_2O_4$ or $C_{22}H_{30}N_2O_4$ to this body, and Oberwarth has determined the lethal dose for guinea-pigs to be one-sixth

of a grain to the kilogramme of animal. In cold-blooded animals, when given in increasing doses, there is a gradual weakening of the functions of the spinal cord, the heart's action is slowed and depressed, and respiration is also depressed. Death is due in frogs to paralysis of the heart's action. Blood-pressure is diminished. In man, according to Löwy's researches, it has a distinct action in the genital sphere. Doses of Yohimbin hydrochloride of from one-tenth to one-sixth of a grain in water, 1:500, produce a marked congestion of the ovaries and testicles, with swelling and increase of sexual desire. In a series of cases of Mendel's the impotence of locomotor ataxia was not affected, but the loss of power in prostatic disease and sexual neurasthenia was favorably influenced.—*Therapeutische Monatshefte*, 1900, vol. xiv., p. 597.

Cough in Phthisis.—DR. J. R. L. DALY advises for the treatment of the persistent hard, dry cough of phthisis, with little or no mucus, the following combination: Camphor, two grains; heroin, one-twelfth of a drachm; creosote, one drop. These are combined, with a proper vehicle, into pills and given in sufficient quantity to produce the necessary relief. This combination not only relieves the cough, but improves the appetite, and, by means of the stimulating action of the camphor, does away in large part with the depression so frequently observed in this affection. The vomiting is prevented by preventing the severe cough.—*New York Medical Journal*, 1901, vol. lxxiii., p. 16.

Physiology and Therapy of Rontgen Rays: The Treatment of Lupus.—DR. J. HALL EDWARDS quotes Tesla as stating that if an aluminum screen be placed between the tube and the exposed part no irritation of the skin follows. Without the screen, following a few minutes' exposure, a tingling and sensation of warmth was experienced. Later there was deep-seated pain, and the exposed hand was swollen and red; acute inflammation followed; the hair was destroyed and nail-growth impaired. These effects probably are due to the presence of the platinum (Tesla). Beyond a short distance no effects were noted, irrespective of the length of exposure. The appearance of the skin is like that following contact with a red-hot iron. The writer, using a less powerful apparatus, finds the harmful effects practically absent. Apart from a special susceptibility of the patient, no ill effects are produced, either in taking radiographs or in using the fluorescent screen, provided that the tube is not brought too near and exposures are short. For therapeutic purposes just the opposite conditions are required for the destruction of tissue. To localize the action of the rays and prevent destruction of healthy tissues round about, an aqueous gelatin solution containing finely powdered iodoform is applied to the healthy skin. Results of treatment of lupus are satisfactory. A more complete knowledge of the length of exposure required and of the after-treatment is still lacking. Following exposure to the rays there is a period of inactivity. That the X-rays themselves have very little or no part to play in the production of burns is shown by the aluminum plate, which prevents burns and is itself wholly transparent to the rays. An electrical origin may be found—*g.*, electrostatic action or electrolytic discharge produced in the skin by the near passage of a current of high potential. In sup-

part of this is the fact that an electrical discharge is felt on the skin of a patient in close proximity to a highly charged Crooke's tube. A distinct crackling is heard and felt. It is noticeable in dry skins but absent in those that are moist.—*Edinburgh Medical Journal*, 1900, vol. vii., p. 139.

Strychnine as an Echolic.—DOTT. ROBERTI has experimented with various doses and is certain that in no instance does it have a direct influence upon uterine contraction, but that the good effects ascribed to it, by various authors, from prolonged administration during pregnancy are due to the general action of the drug and not to any selective action upon the uterus.—*Gazzetta degli Ospedali e delle Cliniche*, 1900, No. 96, p. 1008.

Melan: A New Stimulant for Wounds.—DR. M. HOROVITZ reports a new product prepared by condensation of the flowers, leaves, and stones of *melilotus caruleus*, one of the native legumes of South Europe and America. It is widely cultivated in Switzerland and Southern Germany, where it is used as a dressing for wounds. It is an oily substance, dark brown in color, and markedly aromatic. It is said to have a marked stimulating action on ulcers, and, when combined with a mild antiseptic, its effects on the regeneration of new skin are prompt. The author reports excellent results when used with yellow wax in the proportion of 2 to 3, and with zinc oxide and magnesia in persistent ulcers, *ulcus durum*, *ulcus molle*, and *ulcus cruris*, rhagades, anal fissures, herpes preputialis and balanitis, and in various forms of chronic eczema.—*Centralblatt für die gesammte Therapie*, 1900, vol. xviii., p. 641.

Syphilis and Calomel Injections.—DR. ALFRED FOURNIER, in discussing the value of hypodermatic injections of calomel in the treatment of syphilis, concludes that the routine treatment of syphilis by this means is not to be encouraged. It presents too many disagreeable features if it is necessary to continue its use for a more or less protracted time; but in sudden, severe invasions of the syphilitic virus, such as occur in spinal or cerebral complications, iritis phagedenia, palmar and plantar laryngitis, and at times in some of the syphilitic pneumopathies, it may be recommended strongly. It is, all things considered, a temporary, provisional mode of treating the disease, which serves a useful purpose, with certain limitations.—*Revue de Therapeutique*, 1900, vol. lxvii., p. 721.

Iodism.—DR. DOUGLASS W. MONTGOMERY makes a useful contribution to the untoward action of the iodides. He holds that small doses do not induce iodism more rapidly than larger ones, but the contrary teaching has had credence because of the fact that small doses have frequently given rise to iodism, which, on the continuance of the drug in larger amounts, has disappeared. This is explained by reason of the fact that many people soon become accustomed to the drug, and that tolerance is established shortly after the early irritation induced by the smaller dosage. If administration of the iodides is commenced in small doses, seven to eight grains, iodism rarely occurs. Potassium iodide may be tolerated by the rectum when it would not be by the stomach, and can be given as an enema in water, or, better, in milk, fifteen

to thirty grains, three times a day. Personal idiosyncrasy is the most important element, and nothing will absolutely prevent iodism if the tendency exists. The most important agents capable of modifying some of the symptoms of iodism are belladonna, arsenic, morphine, salol, sulphanilic acid, sodium bicarbonate, and sodium chlorate. Belladonna in five-minim doses of the tincture is sufficient in relieving the coryza. Fowler's solution is the best associate drug if an iodide causes indigestion. One drop to fifteen grains of the iodide is the proportion recommended. Potassium bromide, sulphanilic acid, and sodium bicarbonate have all been recommended, but the author has not obtained valuable results. Sodium chlorate and salol, when given, have permitted of larger doses without the causation of iodism.—*Medical Age*, 1900, vol. xviii., p. 765.

Treatment of Typhoid.—DR. F. C. KEAYS gives the treatment of typhoid followed at the New York Hospital. The tub bath is used as a routine procedure when the temperature reaches 103° F. It is given every three hours, for ten to fifteen minutes, first at a temperature of 80° F. and gradually reduced to 70° to 65° F. Cooled alcohol sponge baths are used when tubbing cannot be adopted. The insomnia is treated by trional and codeine, fifteen and one grains respectively, given by the mouth, or, if there is nausea, by the rectum. Whiskey is also of value, especially in those patients who have habitually used alcoholic drinks. Distention of the intestines by gases is treated by turpentine stupes or by five to fifteen minims of turpentine by the mouth or rectum. Oxalate of cerium, five grains, and sodium bicarbonate, ten grains, are useful for the nausea. The diet should be wholly liquid in the early stages.—*Medical Record*, 1900, vol. lviii., p. 851.

Poisoning by Coal-tar Naphtha.—DR. G. HERBERT DOUTHWAITE reports a case of poisoning by ingestion of this substance occurring in a girl, aged five years, who had evidently taken from two to three ounces. She was seen within two hours and was found then comatose, breathing rapidly and heavily. There was a strong benzol odor to the breath, the face was dusky, somewhat livid, and the extremities were clammy and cold. The pupils were dilated and the conjunctivæ anæsthetic. Artificial respiration, brandy, and respiratory stimulants were successfully used and the child recovered from the poisoning, but two days later developed an acute general bronchitis, from which she died seven days later.—*Lancet*, 1901, vol. clx., p. 245.

Treatment of Gastric Ulcer.—DR. MAYO RONSON says, with reference to this question, that the treatment of this condition is at first essentially medical, and if properly carried out and for a sufficient length of time it is usually completely successful; but in many cases, either from the uncertainty of diagnosis or from the impatience of the patient, care in diet and rest are not persevered in for a sufficient length of time and relapses result; treatment is again resorted to, and relief, but not cure, follows, until in the long run complications supervene or the ulcer becomes chronic, when surgical treatment is in many cases the only method capable of affording relief.—*British Medical Journal*, 1901, No. 2022, p. 257.

OBSTETRICS.

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 UNDER THE CHARGE OF

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The Treatment of Persistent Occipito-posterior Positions of the Vertex.

—Under this title BRODHEAD, in a paper read before the New York Obstetrical Society (*American Journal of Obstetrics*, December, 1900) advises the use of forceps as rotators in persistent posterior rotation of the vertex during labor.

The conditions which should be present before this operation is undertaken are as follows: The head should be as well flexed as possible; the vertex should be well down in the pelvis and preferably at the vulvar outlet; the membranes must be ruptured; the cervix should be fully dilated or dilatable; the bladder and rectum should be empty; last, but not least, the operator should be positive of his diagnosis of position. The patient is placed upon a table and a light chloroform anæsthesia used. The Tucker solid-bladed forceps has been superior to any other. The blades are introduced laterally at the sides of the pelvis, each blade being rotated so as to occupy a position at the side of the head, after which the forceps is locked. Unless the operator be expert it is thought safer to apply the forceps in the usual manner, the concavity of the pelvic curve looking forward, than to attempt rotation with the forceps in the inverted position. By carrying the handles of the instrument toward the thigh of the patient, toward which the concavity of the pelvic curve looks, the danger of laceration is much reduced. The operator then places two fingers upon the vertex at the sagittal suture, and when the uterus contracts it rotates the head partially, so that the sagittal suture is transverse. This is accomplished by rotating the handles of the forceps and carrying the handles downward and backward until the concavity of the pelvic curve faces the lateral wall of the pelvis. The head is then held in this transverse position until several uterine contractions and relaxations have occurred. The head is then rotated with the vertex anterior by rotating the handles, carrying them still further backward and downward. In this way the tips of the blades are kept in the middle of the pelvis, and cannot lacerate the vagina. The head is held in the oblique anterior position for several moments to allow the body to rotate anteriorly. The forceps is usually removed at this time and reapplied in the usual manner and the operation completed.

If rotation cannot be accomplished except by the use of force the head must be extracted in the posterior position. If delivery can be accomplished by the natural forces the forceps is removed. The writer reports eight cases, in four of which the vertex was upon the left side and posterior and in four

on the right side and posterior. Seven of these women had normal pelvis. One, a primigravida, had a justo-minor pelvis. The operation was uniformly successful in these cases. The writer urges that the conditions essential are good flexion of the head, low position of the vertex, and attention to details.

In discussing this paper, CRAGIN said that the same methods, as a rule, were employed successfully at the Sloane Maternity. He urged the necessity for very careful and thorough diagnosis before the application of forceps. The value of the solid-bladed instrument he considered as proved. He had found it of value to introduce one of the blades in the median line and posteriorly, using it as a vectis in starting the rotation of the child's head, then introducing the other blade laterally. He believed that rotation of the forceps was the best treatment for the majority of such cases.

EDGAR had used forceps as rotators for many years to advantage. He preferred the solid blades in these cases. He also believed that the forceps could be adapted to the child's head. In diagnosis he found it useful to search for the ear as a landmark, and had found diagnosis not always easy in these cases. He had not found manual correction of occipito-posterior positions very successful, and he had not succeeded with combined external and internal manipulation. In many cases if the head were brought down upon the levator ani muscle and the patient let alone the case would terminate spontaneously. He believed that the forceps should be applied over the ears of the child and the head brought down to the pelvic floor; then if there were no immediate indication for delivery spontaneous birth might develop. He thought it well to bring the head down in the parturient canal in a transverse position, then to take off the forceps and reapply them, and so bring the head around to the anterior position. In occasional cases in skilful hands the reverse use of the forceps is permissible.

MCLINAN depended upon the hand in making restitution in these cases. He believed mistakes in diagnosis frequent, and that diagnosis by sutures and fontanelles is not always reliable. When the head of the child was hindered in rotation by the body he had been successful by rotating the child in the opposite direction, bringing the vertex through the larger arc of the pelvic circle. It was difficult to account for this phenomenon unless the cord, passed about the shoulders of the child, hindered its normal rotation.

TUCKER thoroughly indorsed the rotation of the occiput by forceps. He mentioned a case in which ventral fixation had been done when the occiput turned behind and rotation was hindered by a deformed coccyx. The head was turned to the front by forceps. In this patient's next labor posterior rotation again occurred, and delivery was effected in the same manner successfully. He believed that if the operation were done promptly before the parts became edematous the pelvic floor and vagina would not be injured by the operation. He preferred the solid-bladed instrument.

VOX RAMBOUR believed that after the shoulders had engaged in the pelvis with the head on the perineum, it was impossible to twist the head through an arc from 90° to 150° without great danger. When the shoulders are not fully engaged and the head is not absolutely on the perineum, this is possible. He believed that when the head is above the superior strait, with the occiput posterior, we can never be assured that anterior rotation is not the result of the natural forces instead of manipulation employed.

The Secretion of Milk.—In *L'Obstetrique*, November, 1900, BUDIN publishes a paper in which he gives several practical points obtained by clinical observation of the secretion of milk.

He calls attention to a not uncommon class of cases in which the secretion of milk becomes established, but is for some time not sufficient to meet the needs of the child fully. Experience has shown that if the child be nourished by suitably prepared cow's milk and the mother be allowed to nurse the child in addition both do well. The child ceases to lose in weight, but gains, and the mother in a few weeks has an increased secretion of milk, which usually enables her to dispense with artificial feeding. He is opposed to abandoning the nursing of the child because the secretion of milk may not be abundant. He would supplement the mother's supply, giving the mother proper nourishment, and would hope and expect that later she would be completely able to feed the child. He also calls attention to the fact that the supply of breast milk varies in accordance with the child's needs. This is demonstrated by comparing the weight of the child with the quantity of milk furnished and also by observing the secretion of milk in the case of twin pregnancies. Here the supply increases to meet the needs of the two children in proportion with their growth.

He narrates some interesting cases in which the secretion of milk has been resumed after a considerable pause. In one instance a woman had been separated from her child in the country, and hearing that the child was ill, returned thirty-four days after its birth. In this case the breasts were well formed, soft, and large, although when the child began to nurse fluid was not present in them.

Abdominal Tumor (Included Fœtus).—In the *British Medical Journal*, 1900, No. 2081, WRIGHT and WYLIE report the case of a female child, aged three months, whose mother gave the following history: The child's abdomen had been swollen since birth, the labor being long and difficult. The abdomen had gradually increased in size and the patient had difficulty in breathing, with chronic cough.

An enormous mass could be felt on the left side of the child's abdomen, reaching forward to beyond the umbilicus. The tumor was dull, its front and upper portion cystic and its posterior part solid; it was smooth and uniform. As the tumor seemed to have fluid contents it was tapped, and nineteen ounces of clear, yellow fluid were removed. This was slightly albuminous. The tumor then became considerably smaller, and its edges could be distinctly felt. It grew larger, however, until it regained its original size.

On operation the tumor was found to have wide attachments, there being a large number of vessels in the capsule. It was removed, and efforts were made to combat the shock, which became severe. These efforts were unsuccessful, the child dying in a few hours after the operation.

On examination the tumor was found to be an included twin or included fœtus. It was intra-abdominal, and of the type known as amorphous or anideus. Some thirty cases of included fœtus in the cavity of the abdomen have been recorded. The tumor is usually found on the left side, is rudimentary in character, and has very few recognizable viscera and structures within its mass. The cystic may be a development of the umbilical vesicle.

Hepatic Toxæmia during Pregnancy.—In the *Medical Chronicle*, 1900, p. 183, FOTHERGILL reports the case of a patient, aged thirty-two years, and pregnant for the first time. She developed great œdema of the lower extremities, scanty urine and abundant albumin, and much bile pigment and urates. The liver was tender on pressure and increased in size. Purgative treatment reduced the liver dulness, and fluid began to collect in the abdomen. The urine was full of bile pigment. As the patient continued to grow worse, the uterus was emptied, and a badly nourished seven months' child was born, living, and survived four days. The patient gradually rallied, and bile began to flow into the intestine. The liver decreased in size, the quantity of urea passed steadily increased, and the patient gradually made a recovery.

In this auto-intoxication of pregnancy it was interesting to observe that the uterus reacted very sluggishly to stimulation. An elastic dilator remained in the cervix for seven hours without setting up uterine contraction. While this patient did not seem to be threatened with convulsions, there can be no question that her condition would have proved fatal from the absorption of the toxins which the liver failed to remove.

Transverse Presentation and Version.—BERRY HART (*Scottish Medical and Surgical Journal*, July, 1900) contributes a paper upon this subject, in which he considers that there are three great varieties of version: The first, cephalic, not often used, and practically performed by external manipulation only. By Simpson's combined version, Hart understands those cases where the internal hand is passed into the uterine cavity to seize a foot, the external hand being also used in the version. This is the usual method for cases in which the fœtus is fixed in the pelvis. Braxton Hicks' method, where the internal fingers do not pass beyond the presenting part, while the external hand aids in the manipulations, usually has the term Hicks' bipolar version applied to it. As regards the foot and leg which should be seized in performing version, Hicks urges to seize the leg which maintains the dorso-anterior position or converts the dorso-posterior into a dorso-anterior. When the back of the child is behind he would grasp the further leg. When the back is in front he would take the leg which lies nearer. When the breech is near the os in dorso-posterior position, traction on the further leg may not alter the posterior position of the back after version, owing to the want of the necessary obliquity in the pull.

[In performing version and extraction the operator must always endeavor to bring the back of the child anterior. If both thighs be grasped, a rotary motion upon the thighs will usually succeed in correcting any tendency on the part of the back to turn behind. If the uterus resists this manipulation, chloroform may be used to overcome its contraction.—Ed.]

Puerperal Inguinal Parametritis.—A very interesting clinical lecture on this important subject by HERMAN is reported in the *British Medical Journal*, 1900, p. 1273. The writer confines himself to the common form of puerperal cellulitis exclusively. He believes that during pregnancy the cellular tissue about the uterus becomes loosened, that it is more vascular than usual, and, hence, that it is naturally a fertile soil for the development of inflammation. In the most common form the inflammation spreads into the in-

guinal region, producing a swelling in the groin. This may end in absorption or in suppuration. When the latter takes place it points above the middle of Poupart's ligament.

We are not able to state definitely the precise cause of this affection. The streptococcus, the staphylococcus, and the bacillus coli communis have been found in the pus. The effects of the same germs vary in different cases. In one a slight local inflammation may result, with very serious septic depressions, while in other cases a more extensive inflammation seems to be well resisted. Attempts to produce cellulitis in animals by the injection of cultures of germs have not been successful. There can be, however, no question that parturition favors the occurrence of this condition, whether by mechanically setting free the germs in these tissues cannot be definitely stated.

Some have thought that laceration of the cervix is a cause. Deep laceration, however, is often found in patients who have never had cellular inflammation, while in other cases no laceration of the cervix is present. Gonorrhoea is not a frequent cause, nor does chilling the body seem to produce it. The labor does not seem to have been especially difficult with these patients. In fact, in two-thirds of the cases there was no difficulty in the labor. The disease occurs more frequently on the left side than on the right.

When we consider the period of the puerperal state at which this complication shows itself we find that many cases are ill from the very day of delivery, while others are affected only after the first week. The later the illness comes on the greater seems to be the danger of suppuration. Pain is a paramount symptom referred to the affected side, and described as burning or shooting. Rigor occurs in about one-quarter of the cases, and varies in severity. These patients were naturally depressed, having a temperature of from 99° to 106° F.

The physical signs were found in swelling, which, starting from the anterior superior spine, approaches the level of the umbilicus. It then runs horizontally inward.

As regards treatment, it must be early, thorough, and persistent. Its essential element consists in absolute rest. This many patients cannot obtain in their own homes, and, hence, should soon be transferred to hospitals. So soon as evidence of suppuration is present the tissue should be incised and the pus allowed to escape. This is usually marked by very decided and permanent improvement.

As regards the length of the illness, the shortest case observed lasted twenty-three days and the longest one hundred and forty-nine days. Among those cases in which pus formed the average length of the illness was ninety-three days. When the inflammation spreads toward the psoas muscle the patient flexes the thigh and complains of considerable pain in this region. These cases are severe. In some cases albuminuria was present without casts and pus. In treatment the most essential thing at first is to keep the patient at absolute rest and maintain her strength by food, using narcotics if necessary. The functions of the body should all be stimulated and a close watch kept of the temperature and of the physical signs indicating suppuration. So soon as pus forms it should be allowed to escape freely.

Eclampsia at Six Months' Pregnancy Treated by Saline Infusion and Veratrum Viride.—BALLANTYNE (*Scottish Medical and Surgical Journal*, July, 1900) reports the case of a multipara, six months pregnant, who had typical eclampsia. The patient was treated by veratrum viride hypodermatically and by the injection of saline fluid into the loose tissue below the breasts. Abortion was also induced, though very slowly, as the os and cervix were so small that an elastic bag could not be introduced. The patient gradually made a good recovery. An interesting point in the case was the behavior of the various specimens of urine obtained. The urine was highly albuminous, and did not decompose as it usually does. It was observed that the urine passed during the eclampsia or just before it did not undergo decomposition, as it normally does.

[Nothing is said regarding the percentage of solids contained in the urine, nor the quantity of urea. The case seems to have been a favorable one for treatment, because albuminuria is, in our experience, less dangerous than a profound and slowly developing toxæmia.—Ed.]

When Should Interference Be Practised in Difficult or Delayed Labor, Especially in Primiparæ?—McLEAN contributes to the *Medical News*, 1900, p. 1033, a paper under the above title. He lays special stress on the preparation of the maternal tissues for delivery. By the natural processes the tissues are so softened that traumatism is reduced to the lowest possible point. It is most important to distinguish between a condition of absolute failure in the progress of labor and one which only marks the usual slow development of the natural process of softening and dilatation. If interference be practised before the tissues are ready, traumatism is almost inevitable. If, on the other hand, operative interference be employed when the tissues are ready for delivery, no serious injury should follow.

GYNECOLOGY.

UNDER THE CHARGE OF
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Post operative Ileus.—WINTERITZ (*Centralblatt für Gynäkologie*, 1900, No. 40) distinguishes three varieties of post-operative ileus, viz., that due to septic peritonitis, to adhesions of the intestines of non-septic origin, and a third form caused by pressure from clamps, gauze, etc. The latter can be avoided in vaginal operations by extreme elevation of the pelvis.

His conclusions with regard to the treatment of this complication are as follows:

1. In cases of non-septic intestinal obstruction following vaginal operations an attempt should first be made to separate the adhesions per vaginam;

this failing, the abdomen should be opened. 2. When ileus follows an aseptic celiotomy the wound should be reopened and the distended gut incised in several places. 3. The same treatment is applicable to cases of paralysis of the intestine. 4. Operative treatment is useless in post-operative septic peritonitis.

Vaginal Celiotomy.—FRITSCH (*Centralblatt für Gynäkologie*, 1900, No. 40) lays down certain rules for the guidance of the surgeon, viz.: Vaginal ovariectomy is justifiable only in the case of cysts which are clearly benign in character. Myomectomy by the vaginal route should be limited to cases in which the tumor is freely movable and does not exceed in size a child's head. An old retrouterine hamatocoele should be attacked per vaginam only, nor should an attempt be made to extirpate the sac. In cases of recent ectopic gestation, on the other hand, larger than the first, which are not easily accessible from below, the abdominal route is to be preferred. Pus-sacs are best emptied per vaginam, but if the operator aims to remove the diseased adnexa and spare the uterine he should elect celiotomy.

Complications of Uterine Fibroids.—FREUND (*Centralblatt für Gynäkologie*, 1900, No. 40) calls attention to the significance of a varicose condition of the veins of the pelvis and lower extremities in connection with fibroid tumors of the uterus. Not only is there considerable danger of hemorrhage during and after operation from distention of the pelvic veins, but pulmonary embolism is a possible result.

The writer reports two fatal cases in which the patients complained soon after operation of severe pelvic pains, with pressure upon the bladder and rectum, followed by a sudden relief of the symptoms, but with restlessness, rapid pulse, and collapse, the temperature remaining normal. In both instances a large hæmatoma was found in the broad ligament, which had exerted so much traction upon the stumps that the ligatures had slipped. The hemorrhage was due to the puncture of large veins below the points at which the ligatures were tied. The same writer describes degenerative changes in fibroids due to sclerosis of the peripheral arteries and venous thrombosis, without purulent foci or evidences of septic micro-organisms. The symptoms due to this condition are those of auto-intoxication, but are quite different from the sapræmic or septic poisoning referable to suppuration in the growth. In the case reported the diagnosis before operation was strengthened by the presence of acetone in the urine.

Lowering of Blood-pressure after Gynecological Operations.—SCHRÖDER (*Centralblatt für Gynäkologie*, 1900, No. 40), as the result of numerous observations, finds that there is a marked difference in the blood-pressure after the removal of diseased adnexa and of neoplasms of the ovaries and uterus, it being lower in the former case. There was a sudden drop in the pressure during the operation, the curve rising gradually for a few days and then declining to its former level. During long operations the fall was often as great as forty or fifty millimetres, but within an hour or two the pressure increased, reaching its highest point on the first night or following days. Between the eighth and fourteenth the curve was lower than at any time,

rising slowly, with slight remissions, to fall again for a short time when the patient first sat up.

In severe operations and when the heart was strongly affected by chloroform the blood-pressure increased very slowly and seldom exceeded the average point immediately after operation. In fatal cases the rise was followed by a sudden and permanent fall.

In pus cases the primary rise was greater than in simple ovariectomies, and after a slight fall continued. After vaginal operations diminution of blood-pressure was less marked and the succeeding increase less than after celiotomy.

Ovarian Cyst Developing from Remains of Ovary.—WALDSTEIN (*Centralblatt für Gynäkologie*, 1900, No. 40) reports four cases from Schauta's clinic in which small portions of cystic ovaries were left behind during complicated operations, the uterus being removed in two instances. In each case a cystoma developed, necessitating a second operation for its removal. The writer concludes that the practice of leaving portions of the ovary after extirpation of the uterus is one of questionable value, the advantages being offset by the possibility of the development of future complications.

Etiology of Climacteric Hemorrhages.—THEILHABER (*Münchener med. Wochenschrift*, 1900, No. 14) believes that in the majority of the cases hemorrhages before the menopause are due to muscular atony. The atrophy of the uterine muscle which is present after the climacteric takes place gradually and is associated with stenosis of the arteries, so that even when the uterine contractions are feeble there is but slight loss of blood. If, however, this atrophy takes place before the stenosis occurs, the muscular contractions are too feeble to control the hyperemia, hence there result profuse menorrhagia, œdema, and hypertrophy of the uterine tissues.

This same atony is the cause of menorrhagia in young girls, in chlorotic and tubercular patients. The prolongation of menorrhagia in patients with uterine fibroids is doubtless due to atrophy of the uterine muscle, with resulting prolonged hyperemia of the mucosa and the development of endometritis fungosa. In consequence of this hyperemia the tumor may grow rapidly at this time, while submucous interstitial growths tend to become polypoid.

Pathogenesis of Fissure of the Anus.—ROSENBACH (*Berlin. Klin. Wochenschrift*, 1900, No. 10) believes that the pain in fissure of the anus is due primarily to the ulcer and secondarily to spasm of the sphincter muscle. The latter is most marked in patients with circulatory disturbances of the pelvis, as at the climacteric or during pregnancy, in whom, in addition to habitual constipation, there is a general hyperæsthetic condition.

In his opinion it is not sufficient to dilate the sphincter forcibly. In addition to regulating the bowels he secures tolerance of the sphincter by instructing the patient to pass the finger into the anus several times daily and later to use rectal tubes of increasing sizes. Under this treatment within four or five days the pain and tenesmus become less marked and eventually disappear.

Prolapsus Uteri in a Young Girl.—VILLEMIN (*Gaz. hebdom. de Méd. et de Chir.*, 1900, No. 15) reports the case of a girl, aged fourteen years, with hypertrophy of the cervix and prolapsus, the cervix protruding an inch from the vagina. The patient stated that two years before, while lifting a heavy weight, she was seized with a severe pain in the abdomen and fainted. On her recovery she felt the protrusion, but concealed the fact on account of modesty.

The cervix was amputated and hysteropexy successfully performed.

[That these cases are not rare is shown by our recent experience in two similar cases, the patients being virgins, aged eighteen and nineteen years respectively. Both gave the history of a severe muscular effort. The cervix was amputated in both instances, followed by ventro-suspension in one and shortening of the round ligaments in the other, with equally satisfactory results.—Ed.]

The Ovaries in Osteomalacia.—SCHARFF (*Centralblatt für Gynäkologie*, 1900, No. 45) denies that certain pathological changes in the ovary are constant in cases of osteomalacia. From microscopical studies of ovaries removed from three osteomalacic patients he infers that neither hyalin degeneration nor hypertrophy of the vessel-walls is characteristic of this condition, as has been affirmed.

Supravaginal Amputation for Uterine Fibroids—GOW (*Scalpel*, 1900, No. 2) reports forty-seven operations, with one death. He always operates by the abdominal method, preserving the ovaries unless they are actually diseased. The stump is carefully sutured in tiers before the peritoneal flaps are united over it. In addition to tying the uterine and ovarian arteries separately the stump is transfixed with a double ligature, which is tied on either side.

Fatal Cases of Gonorrhœal Salpingitis.—KOSSMANN (*Münchener med. Wochenschrift*, 1900, Nos. 10 and 12) reports two cases of subacute pelvic peritonitis in which conservative operations were performed on the ovaries by the vaginal route, the tubes at the time of operation presenting no evidence of pus. In both cases the patients succumbed to diffuse peritonitis, the pus from the abdominal cavity containing pure cultures of gonococci, but no other micro-organisms.

Operation for Adherent Uterus.—STEFFECK (*Centralblatt für Gynäkologie*, 1900, No. 46) reports twenty-five cases treated successfully by the following method: Douglas' pouch is opened and the posterior vaginal wall is divided longitudinally as low down as the attachment of the rectum. Two fingers are introduced, and the adhesions are separated under the uterus, is perfectly movable, and the fingers can be passed over the fundus. The wound is then closed and the anterior vaginal fornix is opened. While the uterus is drawn downward with a volsellum, anterior adhesions are separated and the fundus is sutured to the upper angle of a longitudinal incision in the anterior vaginal wall, which is carried downward from the transverse one. The wounds are then closed with catgut.

The writer emphasizes the fact that the adnexa must be removed when they are diseased. He reserves abdominal section for the most severe cases.

[It is difficult to understand how one can give such unqualified preference to vaginal over abdominal section for the separation of intrapelvic adhesions. Aside from the fact that the operator can never be sure that he has separated all such adhesions when guided by the touch alone, the opportunities for intelligent conservative work on the adnexa are so much better by the abdominal route that it must commend itself to most American surgeons.—ED.]

Hemorrhages at the Climacteric.—LANDAU (*Therapie der Gynäcologie*, 1900, No. 46) insists upon the importance of regarding all hemorrhages at this time with suspicion, and believes that women should be examined from time to time in order to be sure that their genital organs are in a normal condition.

While local atheroma of the arteries, senile endometritis, etc., may account for this symptom in some cases, one should always regard cancer as the most probable condition. In this connection he refers to a series of 190 cases investigated by an English gynecologist in which neoplasms were found in 100 patients, half of these being malignant.

Irritable Bladder.—KNORR (*Ibid.*) describes this condition as marked by frequent micturition and tenesmus, which is frequently regarded as a pure neurosis, though he has rarely found these symptoms present without marked anatomical changes.

In sixty-three cases in which the symptom-complex of irritable bladder was present the organ was not entirely normal in a single instance. In forty-seven pericycitis, adhesions, pressure, etc., were demonstrated to be the cause of the irritability. The treatment recommended is irrigation and distention of the bladder with a solution of boric acid.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Metastatic Gonorrhœal Conjunctivitis—DR. PAGE (Amiens) reports the sudden appearance of all the symptoms of severe purulent conjunctivitis, except the discharge, in a man of forty-five, who was suffering at the time from an active gonorrhœa. Bacteriological examination entirely failed to show the presence of the gonococcus in the conjunctiva. Unsuccessful appli-

cations the conjunctivitis began to improve in two days, and in eight days, except for some small ecchymoses, the eyes were quite well.—*Recueil d'Ophthalmologie*, April, 1900.

[Some cases of this kind have been recorded before, and probably they are less rare than the records would indicate. Morax and Elmassian have demonstrated that the toxins of the gonococcus are entirely able to produce the symptoms of gonorrheal ophthalmia, after the destruction of the gonococci in the culture fluid, or their removal by filtration. But the assumption that the toxins could reach the conjunctiva in sufficient concentration through the general circulation seems rather a bold one, although no more reasonable explanation for such an attack can now be suggested.—ED.]

Retinal Thrombosis and Phlebitis of Gonorrheal Origin.—DR. GALEZOWSKI (Paris) ascribes to the influence of a general gonorrheal infection alterations and thrombosis of the retinal veins, in a man who had suffered for ten years with a urethral discharge, with repeated attacks of rheumatism and violent sciatica, but who was free from syphilis and other probable causes for the vascular disease.—*Société d'Ophthalmologie de Paris*, April 3, 1900.

Tincture of Iodine for Corneal Ulcers.—H. FRIEDENWALD (Baltimore) has employed this treatment in twenty-five cases of dendritic keratitis and marginal ulcer of the cornea without failure to bring relief and without untoward symptoms. He makes the application in the following manner:

A bit of absorbent cotton is wrapped firmly about a fine wood toothpick, so as to form a narrow, firm swab. This is dipped into the tincture of iodine, and the excess allowed to drop off. The eye having been prepared, by instilling cocaine and a drop of fluoresceine, the ulcerated area is thoroughly scrubbed until a distinct brown discoloration of the tissues is seen. The neighboring epithelium is very much loosened and curls up in all directions. It is important to touch this and especially the minute infiltrations seen a millimetre or two away from the main line of ulceration; for the progress of the disease is usually this: that after these infiltrations are observed the furrowed ulceration soon makes its appearance. The only error which is likely to be made is to apply the iodine too cautiously. He has never seen any ill effect from its being used too freely. Since he has become bolder in using it, it is rare that a second application is needed.

The application is usually followed by some pain, lasting for a few hours. The eye is bandaged and an ointment of boric acid, iodol, or the like is applied. The bandage can usually be dispensed with after a day or two, though it may be well to use the ointment a few days longer.—*American Journal of Ophthalmology*, July, 1900

Insomnia from Errors of Refraction.—A. TROUSSEAU (Paris) finds that patients troubled with insomnia generally suffer from headache, although they may not emphasize this symptom. The headache is in the great proportion of cases due to fatigue of the eyes, although it may come on during the night. The fatigue may be due, in hyperopic or astigmatic eyes, to pro-

longed near work during the evenings. In myopes it arises from use of the eyes in distant vision. In some cases the insomnia is the only symptom noted, but the relief from eye-strain is sufficient to secure normal sleep.—*Archives d'Ophthalmologie*, June, 1900.

Iritis in the Prognosis of Syphilis.—A. TROUSSEAU (Paris) reports a series of observations in support of a view of Fournier, that iritis in syphilis is of grave prognostic significance. Of 61 cases 21 had passed from under observation; of the other 40, 6 had experienced but slight trouble; 12 became tabetic; 8 had various cerebral manifestations of syphilis; 2 had died, probably of cerebral or visceral lesions, and the others had suffered from serious tertiary symptoms, chiefly of the nervous system.—*Annales d'Oculistique*, May, 1900.

[Only about 3 per cent. of all cases of syphilis suffer from iritis; but in these cases it is evidently of especial importance, as Trousseau urges, to keep the patient under observation and prolonged systematic treatment.]

Visual Disturbances in Acromegaly.—W. A. HOLDEN (New York) states that nearly two hundred cases of acromegaly have been reported, and that visual disturbances have been noted in about one-half of them. In over 50 per cent. of these there has been concentric contraction of the visual field, with diminution of central acuteness of vision. In somewhat less than 50 per cent. there has been bitemporal hemianopsia, absolute or for colors only, with or without some contraction of the nasal halves of the fields. In half a dozen cases there has been homonymous hemianopsia, absolute or for colors only, and in one case there was found binasal hemianopsia.

There is no special time for the appearance of visual symptoms. These come on, occasionally, soon after the enlargement of the extremities is noticed, but usually not until years after, and the disease may exist for ten or fifteen years without the appearance of any visual disturbance whatever.—*Archives of Neurology and Psychopathology*, v. iii.

DERMATOLOGY.

UNDER THE CHARGE OF

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Monilethrix.—E. WOOD RUGGLES (*Journal of Cutaneous and Genitourinary Diseases*, November, 1900) reports a case of this rare affection of the hair, characterized by a nodose or beaded condition, resulting in baldness of the invaded area, whether on the scalp or other portion of the body. In this affection there exist alternate enlargements and contractions of the

hair-shaft, the enlargements or nodes being long and spindle shaped, causing marked variations in the diameter of the hairs. The most plausible theory as to its etiology is that it is a trophaneurosis, no bacteria being found. McCall Anderson found fourteen cases in five generations, and Sabouraud seventeen cases in five generations. In the present case the hair cloth surfaces) were the seat of the disease, the patient being a man, aged thirty-six years.

Carcinoma Hemorrhagica Developed on a Nervus Vasciculosus.—BUTRILU and ROCHER (*Journal de Médecine*, June 10, 1900) record the case of a woman, aged fifty-four years, who four years before began to show progressive degenerative changes in a nerve that had previously remained quiet. A hemorrhagic tumor gradually occupied the former simple nerve, which on extirpation was found to be composed of polymorphous cells, with large, oval nuclei and a finely granular protoplasm.

Variations in the Elimination of Urea in Dermatitis Herpetiformis.—HARDOUIN (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 11), from the result of his observations, concludes that there is a constant relationship between the variations in the excretion of urea and the eruptions undergone by the patient with dermatitis herpetiformis (painful polymorphous dermatitis). The attacks always take place after a period of hypoxetemia, and always coincide with a considerable increase in the elimination of urea, although this increase may have already begun before the outbreak or may be the immediate sequence of it. The author offers no explanation of this relationship, believing that new observations are necessary before formulating any definite conclusions.

Epicarín.—PREIFFENBERGER (*Dermatologische Zeitschrift*, December, 1900), who has employed epicarín in more than fifty children, from one to fourteen years of age, has found it a most valuable remedy in scabies and prurigo. In the former the effect was always prompt, a cure being obtained without any irritation, even in the severest cases, after five or six injections. The annoying itching disappeared in most cases after the first rubbing, and the average duration of treatment was less than nine days. In prurigo the action of the remedy was quicker and more certain even than in scabies, the itching disappearing with the first injection and the papules vanishing with the desquamation which followed. The following formula was used: Epicarín, 7; cret. alb., 2; vaselin, 30; lanolin, 15; axung. porc., 45.

A New Case of Protozoic Dermatitis.—D. W. MONTGOMERY (*British Journal of Dermatology*, October, 1900) reports the following interesting case: A man, aged twenty-one years, entered the German Hospital of San Francisco apparently suffering from pulmonary consumption. His disease began with cough seven or eight months previous to his entrance into the hospital. The skin lesions, the first of which appeared over the right eye, began as dark red, circumscribed nodules, with purulent tops. The tops ulcerating, ulcers with overhanging, ragged edges formed with dirty, uneven floor, covered by a scab. The nodules, which became quite large, projected

well out from the skin and were constricted at the base, resembling the lesions of mycosis fungoides and those occasionally seen in iodide of potassium poisoning. They caused no particular discomfort nor were they tender upon pressure. The lesions were situated upon the scalp, face, arms, neck, buttocks, and thighs, and numbered between twenty-five and thirty. Microscopical examination of an excised tumor showed coccidioid micro-organisms in great numbers. The patient dying two months later, autopsy disclosed numerous large abscesses in the neck, subcutaneous tissues over the chest, in the pleural cavity, and the lung, all communicating with one another. In the pus of these abscesses coccidia-like bodies were easily demonstrable. The lesions were composed of granulation tissue with giant cells and numerous small abscesses. The micro-organisms were found in the giant cells and scattered free in the granulation tissue, but very rarely in the abscesses. Inoculation of a rabbit was without result.

Sapolan.—MRACEK (*Archiv für Dermatologie und Syphilis*, Band liii., Heft 2 and 3), at a recent session of the Vienna Dermatological Society, introduced a new remedial agent for the treatment of diseases of the skin under the name of sapolan. It is composed of 2.5 parts of a specially extracted and fractionally distilled naphtha product, 1.5 parts lanolin and 3 to 4 per cent. soap, for the purpose of giving it consistency. Employed in five cases of acute eczema, recovery took place in from three to six days; in two cases of chronic eczema rapid improvement occurred after its use. In two cases of senile pruritus the itching was immediately relieved and a cure took place in two to three weeks. It was also successfully employed in impetigo contagiosa, scabies, ecthyma, and urticaria.

The Tuberculides.—T. COLCOTT FOX (*British Journal of Dermatology*, November, 1900) makes a full investigation of this subject, based on the existing literature and his own experience, and concludes that although the pathogeny of these eruptions is not yet placed on a firm basis, yet there exists evidence, both positive and exclusive, pointing to their tuberculous origin; they are not the result of a cachexia or a secondary change arising on a soil prepared by tuberculous infection. The toxic theory (as propounded by Hildebrand) may be excluded, and in this connection it may be noted that tuberculous eruptions are rare in cases of phthisis—cases in which one would expect to note toxins circulating in the blood. In syphilitic eruptions analogous in many respects to the tuberculous cutaneous manifestations occur regularly as a part of the general infection; but in tuberculosis a systemic infection with bacilli is less frequent—the tuberculous infection has a far greater tendency to remain local.

The Bacteriology of One Form of Eczema.—WHITFIELD (*British Journal of Dermatology*, November, 1900), confining his investigations to a single form of eczema, viz., that commonly known as dry eczema (*seborrhoea sicca*), found in all of twelve cases examined bacteriologically a *corpus* of variable size, usually occurring in pairs, the cocci joined by their long axes, resembling gonococci; it also occurred in groups and in short chains. These cocci grew freely upon gelatin, which it did not liquefy, producing a wax-

like streak with slightly crenated edges, at first grayish-white in color, later becoming yellow in some cases, in others remaining of the original grayish-white color. On agar the white growth was indistinguishable from the staphylococcus pyogenes albus. On potato the growth was abundant and slimy. The organism was readily stained by the Weigert-Gran method. Although obtained in a pure culture in one instance, it was usually associated with various other organisms. Inoculation experiments upon the author's own person failed to produce more than a trifling disturbance of the horny layer, which healed immediately. The author does not believe the presence of this organism accidental, but thinks a certain predisposition is necessary in order to establish itself. It corresponds almost exactly with the staphylococcus cereus, albus and flavus, and also appears to be identical with the micro-organism found by Merrill in seborrheic eczema.

An Outbreak of Herpes Zoster.—C. DORRER (*Gazette des Médecins*, December 5, 1899) records an instance where a slight epidemic of sore-throat occurred in a regiment of soldiers, in several of which cases there appeared herpes zoster, two officers who occupied the same sleeping room being affected, one with intercostal and the other with femoral herpes zoster.

Cutaneous Affections Occurring in the Course of Graves' Disease.—S. E. DORR (*British Journal of Dermatology*, October, 1900) first calls attention to abnormal pigmentation, practically much like that met with in Addison's disease, the writer reporting a case in which the lesions of the skin were at first looked upon as being lichen planus and then as vitiligo. [It is to be noted in Graves' disease that the pigmentation occurs chiefly as an excess of the normal pigment of the body.] The writer also calls attention to the existence of trophic changes in the skin and its appendages, hyperidrosis, erythematous eruptions, edema, and other conditions resembling eczema, acne, etc. Vasoconstrictors, especially digitalis and ergot, are considered valuable remedies.

Vegetative Dermatitis of Nurslings.—PRARIS (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 10), under the above title, describes three cases of an unusual cutaneous affection observed in nursing children. The disease consisted of plaques of a deep red, sharply limited, more or less regularly rounded, and decidedly elevated above the neighboring parts. They presented a vegetating surface, and were formed by the union of small papulo-pustules. These plaques varied in size from a twenty-centime piece to a two-franc piece, and were situated upon the face, the wrists (usually the extensor surface), and upon the external surfaces of the thighs and legs. The skin around them presented no alteration. In all the cases observed the infants seemed to be otherwise in good health, but in every instance were the subjects of a more or less abundant seborrhœa of the scalp. The disease was an acute one, lasting from fifteen days to three weeks, the duration depending upon whether it was treated or not. Under treatment it rapidly disappeared. Bacteriological examination showed the presence of yellow and white staphylococci, a small bacillus, and a small coccus. The possibility of the drug origin of the lesions was excluded.

Scarlatiniform Erythema of Parasitic Origin.—PASCAL (*Annales de Dermatologie et de Syphiligraphie*, 1900, Nos. 8 and 9) reports a number of cases of scarlatiniform eruption occurring in soldiers employed in sifting barley. The eruption was most marked upon the uncovered parts of the body, such as the hands, the forearms, the face, and especially the neck. It was accompanied by severe itching and burning, and in one case some degree of fever was present for the first twenty-four hours. More or less abundant desquamation followed. The affection was found to be due to the irritant dust arising, during the sifting of the grain, from innumerable small butterflies which covered the barley.

The Nature of the So-called Angioneuroses of the Skin.—TÖRÖK (*Archiv für Dermatologie und Syphilis*, Band liii., Heft 2 and 3) concludes, from his own investigations and those of others, that all those characteristics by which one distinguishes certain changes of the skin as angioneurotic in contradistinction to inflammatory changes are not proof against careful criticism. A careful examination of the changes occurring in the skin in urticaria, in erythema multiforme, and in erythema nodosum leads one to include them among the simple inflammations.

A Tumor of Sarcomatous Appearance Produced by Multiple Foreign Bodies.—DUBREUILH and VEXOT (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 10) report a case of tumor, situated upon the first phalanx of the right index finger, which followed a wound produced by a piece of oyster-shell. The tumor was the size and shape of an almond and only slightly painful on strong pressure. It was quite soft and fluctuating, but upon puncture nothing but a few drops of blood escaped. A diagnosis of myxo-sarcoma was made and excision practised. Upon microscopical examination the neoplasm was found to be composed of young connective tissue divided into unequal and irregular lobules, which contained numerous small abscesses. In a certain number of these abscesses numerous small foreign bodies were present, which proved on examination to be fragments of oyster-shell. A certain number of giant cells were observed containing from ten to fifty peripheral nuclei and in some cases a minute fragment of oyster-shell. The authors refer to a somewhat similar case reported by Spitzer.

OTOLOGY.

UNDER THE CHARGE OF

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Ozenous Complications of the Ear.—P. LÉCROIX (*Ann. des Mal. de l'Oreille*, etc., November, 1899) has observed in a series of 42 patients affected with ozæna the ear more or less diseased in 30. Most of the ear affections were unilateral, and consisted in chronic catarrhal otitis media

Thyroid Treatment of Chronic Deafness.—Influenced by the recommendations of the use of thyroid in the treatment of so-called chronic catarrh of the middle ear, as set forth in the writings of Vulpin, Ewald, Brühl and Alt, A. BRÜCK (*Arch. of Otol.*, October-December, 1899) tried this drug in 40 cases, varying in age from eighteen to forty-eight years. He used the tablets of Merck, and of Wellcome and Burroughs, giving 0.10 gramme three times daily. Thyroidism occurred in 1 case after a few days of this treatment. In 2 others one dose of 0.30 gramme produced thyroidism, and in 1 case, a corpulent woman, one or two doses produced such profound thyroidism that all treatment was stopped permanently. Brück concludes: "Personally, I must say that from the employment of thyroid, no matter for how long a time, I have not yet seen a single case of positive improvement in the hearing."

Primary Inflammation of the Mastoid Process.—T. HEIMAN (*Ann. des Mal. de l'Oreille*, November, 1899) after reviewing a number of cases of so-called primary inflammation (periostitis, osteitis, etc.) published by both older and more modern writers, and also recording several cases in his own practice that might have been called by other observers primary mastoiditis, but which he considered as entirely secondary products, concludes that "primary mastoid periostitis is, without doubt, a disease appearing very rarely under a distinct clinical form. Primary osteitis of the mastoid exists theoretically, but all those that report its occurrence consider it as an exceptional disease, it being admitted that the cases heretofore described as such a disease rest on error in diagnosis, and that aurists of authority doubt its existence." So far as concerns Heiman's own observations in a large number of patients, he has been unable to find one single case which he could, without hesitation, say was one of true primary mastoid osteitis, and he asserts that from his experience primary mastoid osteitis does not exist. Cases heretofore diagnosed as such a malady were in reality secondary to disease of the external or of the middle ear.

So-called Dangerous Temporal Bones.—L. KATZ (*Archiv. f. Otol.*, November 20, 1899) calls attention again to the fact, also pointed out by L. Trautmann (1898), that "when the angle formed by the mastoid surface and the posterior wall of the external auditory canal is obtuse, the sinus lies far forward," and is in danger of being wounded in mastoid operations. The more obtuse the angle the further forward lies the sinus.

Epidemic Cerebro-spinal Meningitis with Ambilateral Purulent Otitis Media.—S. VON STEIN (*Archives of Otol.*, October-December, 1899) has reported a case of epidemic cerebro-spinal meningitis with ambilateral purulent otitis media in a child of five years, in which both mastoids were trephined and the transverse sinuses exposed and explored by aspiration. The mastoids were filled with "stringy mucus and pus," but the sinuses were free from pus or thrombus. Recovery in all respects occurred in the course of a month. The purulent otitis media in this case may be regarded as part of the intercurrent acute bronchitis. We cannot agree with the opinion advanced by Von Stein, that "possibly in the future the mortality of such cases (cerebro-spinal meningitis), which yield to no other treatment, may

be materially reduced by early opening of the cerebral cavity," nor that "perhaps bilateral opening of the mastoids in typical cerebro-spinal meningitis will act as thoroughly as opening the abdominal cavity in tuberculosis." In our opinion this child recovered from cerebro-spinal meningitis in spite of the mastoid operations and not in consequence of them.

Cold in Acute Otitis and Mastoiditis.—J. O. TANSLEY (*Transactions of the American Otological Society*, July, 1899) is opposed to the use of cold in acute otitis media and in acute mastoiditis, as it may dull the pain too thoroughly and act as a mask of the true state of disease in these parts, thus leading to delay in performing needed operations.

Mastoid Operations.—A. LUCÉ (*Archiv. f. Ohrenh.*, November 20, 1899), while admitting that in many cases he has by the mastoid operation in its various forms cured chronic suppurations in which all other methods failed, also is assured that, after four years' experience in many thousands of cases, he has cured many cases of chronic suppuration of the ears with irrigation with formalin solution (1-1000) in warm water that otherwise would have required a mastoid operation. Furthermore, if a faithful trial of formalin fails to cure a chronic otorrhœa, Lucé considers such a failure as an indication for a mastoid operation. He believes one should be prouder of saying, "I have cured so many cases of otorrhœa without operation," than of saying, "I have performed so many mastoid operations for the cure of purulent otitis media."

Excision of Ossicles.—GRUNERT and ZERONI (*Archiv. f. Ohrenh.*, August 3, 1899) maintain, rightly, we think, that excision of the hammer and incus for the cure of chronic purulent otitis media has been unjustly superseded to a great degree by the so-called radical operation on the antrum and mastoid. Observation of a large number of patients has led them to conclude that excision of diseased ossicles will usually cure the chronic purulency and prevent mastoiditis and its sequelæ, and they have frequently been called upon to perform mastoid operations that would never have been needed if excision of the ossicles by way of the auditory canal had been performed in time.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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On the Growth of Carcinomata of the Skin and Mucous Membranes.
—LOHMEYER (*Ziegler's Beiträge*, 1900, xxviii., 372).

The theory that carcinomata arise by the epithelium growing down into the underlying tissues rests chiefly on the works of Thiersch and Wölkyer, and for many years this view has been generally accepted. Recently, how-

ever, the histogenesis of carcinoma has become the subject of much discussion, owing to a theory advanced by Ribbert that carcinoma does not owe its origin primarily to an increased proliferative energy of epithelial cells, which enables them to invade connective tissue, but to a separation of a group or mass of epithelial cells from their normal relations. This separation, according to him, is due chiefly to a growth of connective tissue which surrounds and cuts off some of the epithelial cells, which then, after their separation, acquire the proliferative power of carcinoma cells.

This theory of Ribbert's has met with a good deal of opposition, partly because it does not agree with the view held by most investigators that there occurs a primary morphological and biological change in the epithelial cells which renders them capable of malignant growth; partly because it is not in harmony with the interpretation heretofore put on a whole series of the most different histologic carcinoma—preparations which have been looked upon as typical pictures.

These pictures and the interpretation of them recur in nearly all of the publications directed against Ribbert's views. The most important of them are the so-called "transition pictures," namely, what is seen at the edge of young and old carcinomata, where the normal epithelium merges, without any distinct line of demarcation, into the fully developed carcinoma.

Ribbert defends his position by claiming that false conclusions have been drawn from these pictures. He interprets them otherwise: The carcinoma may have developed in the middle of a papillary tumor or of an adenomatous polyp—such a combination is not so very rare—or the pictures seen may be due to the growth of the connective tissue leading to papillary projections of the skin and to modifications of glands of mucous membrane; a third interpretation is that the tumor, which grows not only downward and laterally, may also grow upward and become joined to the epithelium covering; in such cases it would look as though the surface epithelium had grown downward. This latter point is unquestionably true, and is accepted by all writers.

Lohmer examined twenty-three carcinomata of the skin and a number from mucous membranes, many of them by means of serial sections. On the basis of his own work and that of others he strongly opposes Ribbert's theory. Eight carcinomata of the lip, for example, showed a marked downward growth of the epithelium, in most cases to the muscle layer. As a rule, it extended as broad, thick masses into the connective tissue. In seven of the cases there was a gradual merging of the normal epidermis into the tumor. In all of these cases a secondary junction of the normal downward projections of the epidermis with extensions of the tumor could be ruled out, as could also the assumption that the carcinoma developed in the middle of a papilloma or that the epithelial processes were stretched by a growth of connective tissue. The writer believes that the infiltration of the cutis with round cells is secondary, and follows the changes due to the epithelial invasion.

In carcinomata of the mucous membranes he found an upward growth of the tumor and union with the epithelium rather more frequent than in carcinoma of the skin.

The writer believes that Ribbert's theory does not fit all cases, because in the greater number of the carcinomata which he examined a direct growth

of the tumor into the depths and a spread at the periphery could be demonstrated. Long, branching masses of epithelium could be followed without any break from the surface epithelium directly into the underlying connective tissue. At its periphery the tumor spreads by gradual involvement of the neighboring epithelium, which then grows directly downward into the underlying connective tissue. It is necessary to return, therefore, to the assumption that the starting-point of a carcinoma is to be found in a primary proliferative energy of epithelial cells. The cause of this proliferative energy is still unknown.

Gland-like Carcinoma of Epidermic Origin.—KROMPECHER (*Ziegler's Beiträge*, 1900, xxviii., 1).

Braun, in 1892, described certain tumors of the skin which differed clinically and histologically from the ordinary epidermoid carcinomata, and which, according to him, could not be derived from the glandular structures of the skin. He declared them to be endotheliomata.

According to Krompecher, the diagnosis of endothelioma can be made only when the origin of the tumor masses from the lymph endothelium of the larger lymph spaces can be directly followed or when a carcinoma-like tumor is found in places such as bone and lymph nodes, where epithelium is lacking and the structure of the suspicious tumor corresponds to that of tumors already firmly established as endotheliomata.

Braun was not able to demonstrate the origin of the tumors from endothelial cells, and the histological picture does not at all correspond to the picture of proved endotheliomata. He based his diagnosis on the difference of structure as compared with ordinary epidermoid carcinomata, on the absence of epithelial pearls, and especially on the lack of any connection between the tumor and the skin.

Krompecher believes that these tumors are not endotheliomata, but carcinomata. He bases his arguments and opinions on a study of thirty-three cases, of which twenty-one are described in detail. The tumors were derived from cheek, forehead, breast, eyelid, nose, back, tongue, cervix uteri, lumbar region, and ear.

In fourteen of the twenty-one cases he was able to demonstrate by means of serial sections the connection of the tumors with the surface epithelium and thereby prove their epithelial character.

The striking feature of these tumors is their microscopical structure. While the epidermoid carcinoma is composed of the cylindrical cells of the stratum Malpighii and of polygonal prickle cells, which by cornification give rise to the epithelial pearls, the group of tumors under consideration is distinguished by the fact that only the cylindrical layer of the stratum Malpighii grows; the epithelial cells constantly retain their embryonic character, and the nests of tumor cells consist simply of long, cylindrical cells, which stain intensely. Under a high power such a tumor often looks strikingly like a spindle-cell sarcoma. Inside of the cell nests no cornification or formation of epithelial pearls can be found.

The microscopical picture of these growths varies greatly according as the cells grow as solid masses, in narrow "meandering" ribbons, or lining canals and cysts. Combinations of these various forms occur with each

other and also rarely with the ordinary form of epidermoid carcinoma. The writer recognizes six different types, but it is not necessary to consider them in detail here.

Secondary degeneration of the connective tissue stroma is frequent and quite characteristic. The degeneration may be hyaline or myxomatous.

Krompecher believes that the gross and microscopical appearances and clinical features of this class of tumors are sufficiently peculiar and characteristic to establish them as a separate group of carcinomata, to which he gives the name "carcinoma epitheliale adenoides."

Suppurative Myelitis in a Case of Bronchiectasis.—CHUARI (*Zeitschrift f. Heilkunde*, 1900, xxi., 351) sums up the brief literature of suppurative myelitis, and adds a case which came under his observation. But fourteen cases in all have been published: of these, three were traumatic in origin, and three were due to direct extension from lesions outside the cord. Of the remaining eight cases, three occurred as metastatic lesions in cases of bronchiectasis.

In the case reported by the writer, beside meningitis of the brain and cord, abscesses filled with thick yellowish-green pus were found in the cerebellum and in three different parts of the cord.

In the lower lobes of the lungs were numerous bronchiectatic cavities up to the size of hazel-nuts, and the bronchi showed numerous cylindrical dilations.

Coverslip preparations from the pus in the abscesses and in bronchiectatic cavities showed the micrococcus lanceolatus, and the same micro-organism was obtained in cultures.

Sections through the wall of the abscesses in the cerebellum and in the cord showed, however, beside the micrococcus lanceolatus, numerous clumps of fine, branching threads which stained by Gram; they lay partly within bloodvessels, partly in the perivascular lymph spaces. The micro-organism was evidently a streptothrix and closely resembled the actinomyces. It was not obtained in the cultures. Evidently it had reached the nervous system metastatically from the bronchiectases through the circulation.

The case suggests, the writer thinks, that it would be well to examine the bacteria present in cases of bronchiectases; the actinomyces may be found because such a large proportion of the cases of myelitis are associated with bronchiectasis, and because the actinomyces is the micro-organism which seems most frequently to give rise to metastatic lesions in the central nervous system.

In favor of this view the writer mentions a second case of his in which there were both bronchiectasis and abscess of the brain with secondary suppurative meningitis. Both in the bronchiectatic cavities and in the abscess of the brain a streptothrix was found resembling in all respects the micro-organism of the case reported.

Internal Pachymeningitis.—MELNIKOW-RASWEDENKOW (*Ziegler's Beiträge*, 1900, xxviii., 217).

Jores and his students have claimed that idiopathic pachymeningitis is a pathological process which has its seat in the capillary layer, perhaps also in

the bloodvessels generally, of the dura, and which gives rise to a new formation of capillaries and to constantly recurring hemorrhages.

As this is contrary to the generally accepted view, the writer reinvestigated the subject. He studied, first, the normal structure of the dura, using particularly Weigert's elastic tissue stain. In the inner of the two layers of the dura could be distinguished from within out: 1. A single layer of epithelium, which covers the inner surface. 2. A hyaloid, fenestrated, elastic membrane, which varies much with age and with the individual; it is absent at birth, is well marked in early adult life, and is thick in old age. 3. The inner capillary network. 4. A layer of connective tissue mixed with elastic fibres. According to the results of histological and embryological investigations, the dura mater is a peculiar formation and has nothing in common with the pleural and peritoneal serosæ.

The writer then studied twelve cases of pachymeningitis. Of these, three only showed proliferation of the epithelial cells on the inner surface of the dura, with some exudation of fibrin and leucocytes. The important point was that the process occurred on the surface of the internal elastic membrane. Later, organization of this exudation takes place; thin-walled capillaries grow out from the capillary layer through spaces in the internal elastic membrane.

It is characteristic of this process for hemorrhages to take place from these newly formed bloodvessels; they often burst, and then the blood pours out into the delicate, loose connective tissue. The exuded blood is rapidly absorbed, as is shown by the numerous pigment masses of various sizes. The pigment lies partly in cells, partly out of them, and is heaped up especially around the bloodvessels in the deeper layers close to the limiting elastic membrane.

There may be repeated hemorrhages; then there are several layers of connective tissue showing different stages of development; the oldest is next to the internal limiting membrane.

The general view that the pathological process is an inflammation, with hemorrhage following as a complication, is accepted by the writer. The less accepted view of a hemorrhage on the surface of the dura followed by inflammation may occasionally be true.

In the origin of pachymeningitis in man toxæmias play an important part. They produce the histological changes in the dura, in consequence of which the peculiar inflammatory process develops.

The Pigment in Brown Induration of the Lungs.—NEEMANN (*Wiener's Archiv*, 1900, vol. clxi., p. 422) has recently been investigating the question whether the well-known yellow to reddish-brown pigment which occurs in the lung in chronic passive congestion, and which gives the iron reaction, can lose this power to give the iron reaction and change to a melanotic pigment. The problem was taken up because the results obtained by various investigators of this subject do not agree.

In his investigations Neumann found along with carbon, which is never lacking, only one other pigment, and that differed in no way from the hemosiderin which arises in other parts of the body from extravasations. It has a more or less saturated yellow, yellowish-brown, or reddish-brown

color, without any gray, blackish, or black tinge; often it appears colorless, or at least of an extremely pale yellow, and it always gives a strong iron reaction.

Examination of fresh tissues is advised; but tissues hardened in alcohol or in Müller's fluid give good results. Artificial stains are for the most part unnecessary and in part disadvantageous. It is best to compare parts of the lung which macroscopically show no carbon with other parts containing much of it. Where carbon is wanting the usual masses of hemosiderin are found, chiefly within the large "heart-failure cells" in the alveoli. Where much carbon is present the masses of pigment are darker in color, and lie mostly in the connective tissue stroma; the low power of the microscope shows all transitions from yellow hemosiderin to black carbon. High power shows that each dark pigment mass consists of a central black nucleus surrounded by a yellowish mantle of varying thickness. The unquestionable interpretation of these masses is that they are particles of carbon surrounded by hemosiderin. In this way arise the pigment granules first described by Virchow and later forgotten, namely, one-half or one-third black and the rest yellow or red.

Against the view that these central black bodies are due to a secondary melanotic change of the substance of the hemosiderin, he urges the facts that the dark nuclear formations are usually sharply limited at the periphery and show no zone of transition, and that several dark nuclei may lie within one pigment mass.

He believes that the retrograde changes in the pigment, instead of beginning in the middle of a mass and proceeding outward, begin at the periphery, and he regards the colorless border around the carbon particles as the last stage in the metamorphosis of the hemosiderin.

He believes, further, that the hemosiderin is deposited on the carbon from hemoglobin in solution, and that red-blood globules cannot turn to yellow and brown granules without solution taking place.

The Histological Changes in Striated Muscle Adjoining Malignant Tumors.—FUJISAMI (*Virchow's Archiv*, 1900, clxi., 115) studied the effects produced on muscle-tissue by twenty sarcomata and seventeen carcinomata.

In general the two classes of tumors may be said to invade muscle-tissue in much the same way. They may infiltrate between the separate muscle-fibres, they may press against them as a mass, or they may be separated from the fibres by bands of connective tissue, thus affecting the muscle-fibres indirectly only.

The infiltration takes place not only through the tissue spaces and the lymph and bloodvessels, but also through the sarcolemma sacs. This invasion of the sarcolemma sac and extension through it is much more common with carcinoma than with sarcoma. It is especially marked where the infiltration of the muscle is parallel with the muscle-fibres. With the sarcomata it has been observed only in the round-cell variety. The invasion or non-invasion by the tumor-cells of the sarcolemma sac depends on the biological relation of the tumor-cells themselves, on the direction of their growth, and on the nature of the changes in the muscle-substance.

The changes which take place in the muscle-fibres as the result of the invasion of muscle tissue by the tumor are manifold. All the possible degenerative changes which occur in the various lesions of muscle may be present, and they may occur very irregularly in the individual fibres. The commonest form is simple atrophy, but the most interesting are (a) the multiplication of the nuclei, (b) the irregular or ampullar atrophy, and (c) the formation of giant-cells.

(a) Ordinarily the muscle nuclei disappear as the muscle-fibre atrophies. In other cases, however, they appear very active, increasing greatly in number (the writer counted 153 in one fibre), chiefly, perhaps exclusively, by direct division. They may form single or double rows, or (c) may collect in clumps which on cross section appear like giant cells.

(b) Sometimes the tumor cells press against the side of the muscle-fibres causing irregular atrophy which gives an ampullar or beaded appearance to the muscle-fibres.

One point to be insisted on is that all the changes which occur in regenerating muscle, and which are looked upon as regenerative in nature, occur practically in the same form at the periphery of a malignant growth where there can be no question of regeneration. Apparently the muscle-fibre can show at a certain stage of regressive change an appearance similar, or nearly similar, to that seen at the beginning of its development; it is necessary, therefore, to guard against judging from microscopical examination only whether regeneration or degeneration is present.

In many cases there occurs at the edge of the tumor, as the result of reaction on the part of the tissues, a change in the interstitial tissue of the muscle due to round-cell infiltration, growth of the connective tissue, and growth of the intima of the vessels. These all exert an effect on the muscle-fibres. A round-cell infiltration of the perimysium at the edge of the tumor is, as a rule, more frequent and more marked with carcinoma than with sarcoma.

Two conclusions drawn by the writer cannot be accepted without further proof, namely, that cell formations may arise from altered muscle-fibres and take part in the formation of tumor-cells, and that the muscle-fibres may be converted into connective tissue.

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FAUCES

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FEMORAL

Fauces (faw'seez). [L.] The communication between the throat and pharynx. It is bounded on either side by the *Pillars* or *Arches of the f.* (formed by the palato-glossus and palato-pharyngeus muscles), which include between them the tonsil; above by the uvula; and below by the tongue. The intervening clear orifice is the *Isthmus of the f.*

Fauchard's disease (fah-shahrz). *Pyorrhea alveolaris*.

Faucial (faw'shee-al). Of, pertaining to, or situated in the fauces, as the F. tonsil; passed through the fauces, as a F. (Eustachian) catheter.

Favus (fay'vus). [L. = honeycomb.] *Tinea favosa*: a contagious disease of the skin of man and of the lower animals, due to a vegetable parasite (*Acho'rion Schönlein'ii*), and marked by round, cup-shaped, sulphur-colored crusts which are generally situated over hair-follicles. F. usually occurs first upon the scalp, but may occur anywhere upon the cutaneous surface and upon the nails. The crusts are at first discrete, afterward confluent; are accompanied with redness of the surrounding skin, violent itching, and a peculiar odor like that of mouse's urine or mouldy straw. The hairs fall out, the loss often being permanent. Treatment: removal of crusts by soaking in oil and the subsequent application of mild detergent lotions; after the skin is clean, application of parasitocides (mercurials, especially the oleate of mercury; sulphur); tonics and constitutional measures.

Febricula (fee-brik'yū-lah). [L. = dim. of *febris*.] A slight and transient fever; feverishness.

Febrifuge (feb'ree-fewj). [L. *febris* + *figāre*, to put to flight.] Dispelling fever; a remedy dispelling fever.

Febrile (feb'ril). [L. *febrilis*.] Of, pertaining to, or characterizing fever, as F. symptoms, F. urine; accompanied by or producing fever, as F. disease. F. ic'terus, Weil's disease.

Feb'ris. Pl. feb'res. [L.] Fever; as F. puerperal'is, puerperal fever, F. hec'tica, hectic fever. F. enter'lea, typhoid fever. F. gas'trica, a name given to typhus, typhoid, and other fevers and to acute gastritis. F. morbill'o'sa, measles. F. nervo'sa, typhus fever. F. pestilenta'lis, typhus fever or the plague. F. petechia'lis, typhus fever. F. rubra, F. scarlatina'sa, scarlet fever. F. urtica'ta, urticaria. F. vir'gtnum, chlorosis.

Fecal (fee'kal). [L. *fecalis*.] Of or pertaining to feces; containing or discharging feces, as F. abscess, F. fistula.

Feces (fee'seez). [L. *fecēs*, pl. of *fec* = sediment, lees.] The undigested residue of food with added effete matters, forming the material which accumulates in the large intestine and is voided by the anus. F. consists of cellulose, chlorophyll, fat-globules, fragments of muscular fibres, connective-tissue fibres (white and elastic), mucus, cholesterolin, free fatty acids, salts of the fatty acids (soaps),

mineral salts (especially the mineral phosphates), pigments derived from the bile (stercobilin), nitrogenous bodies (including excretin and the odoriferous principles skatol and indol), and ferments capable of digesting proteids and starch.

Fechner's law (fech'nerz). [Fechner, G. scientist.] The law that the sensation produced by a given stimulus varies as the logarithm of the latter. It is expressed by Fechner's fundamental formula, $S = C \log T$, where S = the sensation, C is a constant, and T is the stimulus; and by Fechner's formula of difference, or $S - S' = C (\log T - \log T')$, where $S - S'$ represents the difference between two sensations produced respectively by the stimuli T and T' .

Fecula (fek'yū-lah). [L. *fec'ula*, dim. of *fec*, lees.] 1. Lees or sediment. 2. Starch meal.

Feculent (fek'yū-lent). [L. *ficulent'us*.] Filled with fecula or sediment.

Fecundation (fek'un-day'shun). [L. *fēcundātō*, fr. root *fe-*, found in fetus.] The act of fertilizing or impregnating. Artificial f., f. by semen injected through a syringe or similar apparatus into the vagina.

Fecundity. The state of being fecund or fertile; ability to conceive and bear young.

Fehling's solution (fay'lingz). [Fehling, G. chemist.] A solution of cupric hydrate and sodium and potassium tartrate (*Solutio cupri tartarici natrona'ta*, G. P.), used as a test for glucose and other substances. These when boiled with F's s. reduce the copper salt to copper oxide, which is precipitated as a red powder. 10 cubic centimetres of the solution are reduced by 0.05 gramme of glucose.

Fel. Pl. fella. [L.] See *Bile*.

Fell'ic acid. An acid, $C_{23}H_{40}O_4$, occurring in human bile.

Fel'on. [Fr. the same root as *fell*, cruel.] Whitlow; paronychia; a suppurative inflammation of the structures of the finger. It may be superficial, being then usually seated about the nail (run-round); or deep-seated, in which case it involves the periosteum and bone, is accompanied by severe constitutional symptoms and great pain, and produces necrosis. Treatment: leeches, poultices, and opiates for pain; early and free incision.

Female (fee'mayl). [Through F., fr. L. *fēmcilla*, dim. of *fēmina*, woman.] 1. Of or peculiar to a woman; as F. urethra, F. organs of generation. 2. Adapted for the organs of a woman; as F. cath'eter. 3. Having a hollow or slot fitted to receive the prominence on a part otherwise similar; as the F. blade of a forceps.

Femor'al. [L. *femorālis*.] 1. Of, pertaining to, or situated in the thigh; as F. muscles, F. artery, F. hernia, F. neuralgia. F. arch, Poupart's ligament. 2. Of or pertaining to the f. vessels, as the F. sheath; or to other parts contained in the thigh, especially f. hernia. F. canal, the canal adjoining the f. vessels through which a f. hernia descends. F. ligament, the deep crural arch.

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THE
AMERICAN JOURNAL
OF THE MEDICAL SCIENCES.

MAY, 1901.

THE PROTOZOON OF CANCER.

A PRELIMINARY REPORT BASED UPON THREE YEARS' WORK IN THE NEW
YORK STATE PATHOLOGICAL LABORATORY OF THE UNIVERSITY
OF BUFFALO.¹

BY HARVEY R. GAYLORD, M.D.,
OF BUFFALO,
DIRECTOR OF THE LABORATORY.

PART I.

IN January, 1899, at a meeting of the Medical Society of the State of New York, in Albany, the writer made a statement regarding certain observations made by himself in the State Pathological Laboratory. As these remarks appear in the *Transactions* of this society, they are as follows :

"Others have found organisms in cancer and have explained them as protozoa. Sanfelice and all observers of alleged parasites in cancer have noted the great variability of these forms in the tissue. As a result of our preliminary work, we think we have discovered the reason for this. We owe to Busse the knowledge of the fact that all staining methods are unreliable for such research. We therefore worked with the fresh methods, although we found at first that it was very confusing. We have discovered in all the cases of cancer so far examined that by fresh methods the organisms can always be found. These bodies resemble fat in the fresh state. It was only when we applied the ether test and the osmie-neid test that we discovered that they were not particles of fat.

¹ This article represents the report officially transmitted to the Legislature of New York conformably to the act establishing the New York State Pathological Laboratory at the University of Buffalo. No previous authorized publication has been issued. The author deems it due to himself to make this general disclaimer.

We next discovered that we could crack their edges with the cover-glass. There was no reason, even then, to believe that these might not be unusual forms of fat. We next injected them into the abdominal cavities of animals. Most of the animals developed peritonitis, and large quantities of these bodies could be obtained from the peritoneal fluid. In the last few days we have observed the round form develop under the cover-glass. They can be found in every cancer if properly sought for, and can be injected into animals and be recovered. They also change their form.

"We would not have made these statements were it not for a remarkable experiment at the beginning of this work. Dr. Park had a case of abdominal carcinosis. An exploratory incision was made, and a quantity of the serum from the abdominal cavity was given to me for investigation. It was in this fluid that we first found these bodies, and observed that they did not increase. After the fluid had been kept in the thermostat for three weeks we could still find the same bodies. They were then injected into the jugular vein of a guinea-pig, and three weeks and a half afterward, on killing the animal, we found a primary adenocarcinoma of the lung. This experience, we may say, is unique. The fluid had been carefully sedimented, and the fluid for inoculation taken from the top, so that it was not at all probable that cancer cells were actually introduced into the animal. In the case from which the fluid was taken the growth was a colloid carcinoma, but this was not the form of cancer which developed in the inoculated animal. It is also to be noted that carcinoma in the guinea-pig is extremely rare."

Since the period of this statement our attention has been principally turned to an investigation into the nature of these parasites, in attempts to demonstrate them in the tissue, and in attempts to cultivate them. The following is a detailed report of the experiment:

CASE I.—S. N., a male, aged fifty-one years, a patient of Dr. Park. He was seen at his home, and presented physical signs of a large intraperitoneal tumor. The patient was removed to the Buffalo General Hospital, where an exploratory operation was performed by Dr. Park on August 12, 1898. Preparations had previously been made to collect aseptic fluid in sterile tubes and flasks. Dr. Park opened the distended abdomen with the usual aseptic precautions, and a sterile tube was inserted in the opening and about half a litre of the fluid was permitted to flow into a flask. Then three test tubes in succession were held beneath the running tube, and the remainder of the fluid was drawn off in separate flasks. The fluid which was removed from the peritoneal cavity was slightly blood-stained, but did not coagulate. The three tubes, labelled *a*, *b*, and *c*, were immediately placed in the writer's inside vest-pocket and were carried warm to the laboratory, where they were placed in the thermostat. The flasks were not treated in this manner, but were allowed to fall to the room-temperature and were not incubated. Inoculations upon bouillon, sugar-

water, and acid sugar-water, as well as agar and blood-serum, were at once made from all three tubes. A careful microscopical examination was likewise made of the peritoneal fluid, which was found to contain a few blood-corpuscles and some pale spherical bodies, in size varying from 2 to 10 micromillimetres. They were homogeneous, of pale, yellowish-green color, and at first were mistaken for fat droplets, although on closer examination their refractive index was seen to be too low. They were likewise resistant to ether, even when the fluid or tissues containing them were first treated with potassium hydrate, then centrifuged, washed in water, treated with 60, 80, 95 per cent., and absolute alcohol, washed in absolute alcohol and ether, equal parts, and then placed in an ether extractor for four days. When treated with osmic acid they failed to give the black reaction which characterizes fat. Attempts to stain them were partly successful, and it was found with cover-slips fixed by heat that although the bodies were greatly deformed by the process a certain number of them could be stained with carbol-thionin or the usual aniline dyes. Some of these bodies, though not very numerous, contained granular material, which showed marked Brownian movement. The tubes were examined from day to day, and we were able to demonstrate that these spherical bodies gradually increased in size, became more indefinite, and gradually lost their yellowish-green color. As they increased in size they apparently became more fluid and commonly sent out pseudopods and long projections. Fine colorless granules appeared in the protoplasm, and in some a delicate nucleus could be made out. Ultimately the larger forms of the organism became transformed into what appeared to be large sacs containing highly refractive granules and small spherical bodies, not unlike the free spherical bodies above described. The membrane of the sac was demonstrable as a pale colorless structure. The diameter of these sacs was on the average about 20 to 25 micromillimetres, or the size of a good-sized epithelial cell.

On August 19th 3 c.c. of tube *a* were injected into the peritoneal cavity of a female dog. On August 20th a fine surface growth was noted in tubes *a* and *b* of a small organism about the size of a coecus, which presented a peculiar bud-like growth and which resisted all attempts at cultivation. On August 25th 3 c.c. of fluid from tube *c* were injected into the jugular vein of a full-grown guinea-pig (Fig 1). On August 26th 4 c.c. of the same tube were injected into the peritoneal cavity of a second guinea-pig (Fig 2).

On August 29th the patient, who since the operation had not been doing well, died. Unfortunately the autopsy was begun by the attending physician, who opened the abdominal cavity and had already contaminated its contents before the peritoneal fluid was collected.

The following is extracted from the autopsy notes:

Autopsy four hours after death. Body of a well-formed, middle-sized man. Muscular structure well developed, skin pale, fat scanty. Peritoneal cavity contains a large amount of serosanguineous fluid. The peritoneum is greatly thickened, contains a large number of translucent vesicles, which are likewise scattered over the entire peritoneal surface, including that of the liver and the under surface of the diaphragm. The pelvic cavity is entirely filled with these gelatinous masses. On

removing the enlarged omentum it is found to measure 95 cm. in the long axis. Its greatest thickness is 12 cm. After removing the omental tumor the intestines are apparently free, except a large encapsulated mass of gelatinous material near the ileocecal junction, apparently involving the lumen of the intestine. Intestines are removed without difficulty, when the tumor in the neighborhood of the cæcum is found to be firmly attached to the peritoneal wall, is apparently of a cystic nature, and contains a mass of gelatinous material. On opening the intestine no connection between the lumen of the cæcum and the tumor mass can be detected. The tumor mass, however, involves the appendix, which is obliterated. The spleen is dark red in color, and weighs four ounces. The right kidney is embedded in a mass of gelatinous material. The capsule of the kidney strips easily, the diameter of the cortex is 5 mm., of grayish-rose color. The papillæ are anæmic. Kidney pelvis unchanged. Left kidney same as right. The gelatinous material in the pelvis fills in the space between the rectum and bladder. The entire under surface of the diaphragm is thickly infiltrated with gelatinous vesicles. The liver is adherent to the diaphragm, and the suspensory and round ligaments are thickly infiltrated with gelatinous material. The gall-bladder is distended; the gall-duct patulous. On section the liver presents a typical nutmeg appearance, and the substance of the organ is apparently not at any point invaded by the gelatinous material. On opening the thoracic cavity the lungs extend well forward; pericardial sac contains a small amount of clear, straw-colored fluid. On opening the pericardium the heart is somewhat small, the heart muscle of a pale, brownish color. In the right ventricle is a large rose-colored clot, which extends into the pulmonary artery. The lungs contain a normal amount of air, show grayish and red mottling, but no evidence of metastases. Projecting into the left pulmonary artery is a large thrombus, adherent at various points and extending into the branches of the pulmonary artery. The bronchi contain frothy exudate. The right lung presents the same characteristics as the left, and the right pulmonary artery likewise contains a thrombus. The transverse and descending aorta shows a moderate amount of sclerotic change. The bladder and genito-urinary tract are free from abnormalities. The omentum and the cystic mass attached to the cæcum were removed and preserved for further examination.

Anatomical Diagnosis. Colloid carcinoma of the peritoneum; thromboses of the pulmonary arteries; atheroma of the aorta; brown atrophy of the heart muscle.

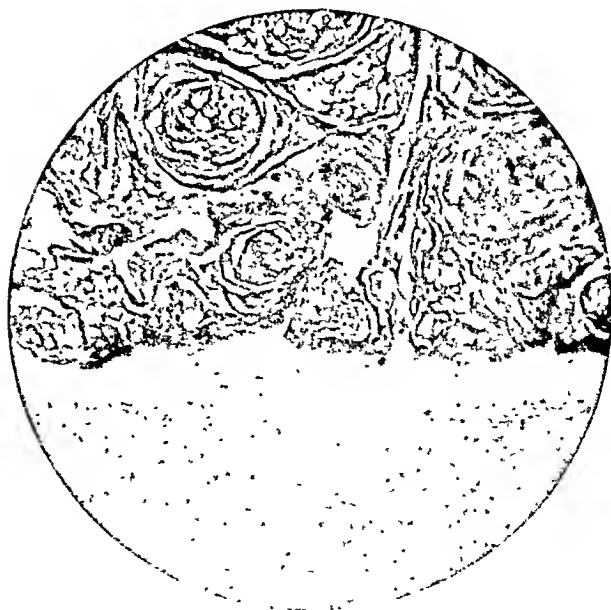
The microscopical examination of the fresh material from the vesicles of the tumor shows it to consist of a finely granular or homogeneous material, containing a considerable number of degenerated epithelial cells and the small spherical bodies noted in the peritoneal fluid. Examination of the peritoneal fluid from the cadaver showed that it likewise contained large numbers of the various forms of the organism. Portions removed from different parts of the tumor were hardened in various hardening reagents. The examination of the hardened and stained sections shows the tumor to be an adenocarcinoma of the omentum, which has undergone advanced colloid degeneration. The gelatinous vesicles show the typical appearance and characteristics of colloid carcinoma. They penetrate between the muscle fibres of the diaphragm into the layers of the capsule of the liver and involve the





1.

Adenocarcinoma. Case I. (M. P.) (H. E.)



2.

Colloid mass from under surface of liver. Case I. (M. P.) (Methylene blue)

entire thickness of the omentum. The muscle fibres or connective tissue structures are forced apart by the gelatinous material.

In the neighborhood of the cæcum the colloid degeneration of the intestine is not so marked as in the other portions. Here the epithelial structures may be seen invading the abdominal wall and the mass of adherent structures which surround the growth. The description of a section from the growth in the neighborhood of the cæcum and one from the colloid portions of the tumor will include the principal characteristic features.

Slide 2. A section taken from the region of the primary tumor, hardened in alcohol, stained with Delafield's hæmatoxylin, includes a portion of the subperitoneal fat and the wall of the tumor. The connective tissue stroma of the section is thickly infiltrated with round cells. In the deeper portions of the section are a number of muscle fibres, likewise infiltrated with round cells. Extending through the entire thickness of the section are large, epithelial, glandular structures and nests of isolated cylindrical epithelium. (Plate I, Fig. 1.) Near the surface of the tumor these glands are broken up, and the epithelium is scattered through the stroma without definite arrangement. The cylindrical form of the epithelium is likewise changed, and here and there concentric structures closely resembling epithelial pearls may be noted. In the large glandular structures the epithelium is commonly several layers deep. The nuclei are large, deeply-stained, of irregular form and irregularly placed. The protoplasm of the cells stains deeply. Karyokinetic figures are uncommon. When examined under high power a number of the cells are found to contain typical Plimmer inclusions and the various forms beginning with small spherical bodies known as Russell fuchsin bodies and certain deeply stained bodies within the nuclei and protoplasm of the cells, which we now recognize as the younger forms of the parasite.

A portion of the tumor covering the under surface of the diaphragm, the surface of the liver and the peritoneal surface, which shows the typical vesicle formation characterizing this growth, reveals, on microscopical examination, the typical appearances and structure of an adenocarcinoma in an advanced stage of mucoid degeneration. The description of a single slide will suffice.

Slide 10, from material hardened in Flemming's mixture, embedded in paraffin and stained with iron hæmatoxylin Bordeaux red, through a large mass of gelatinous material from the under surface of the diaphragm. Tumor is divided into large vesicular structures, which, under the microscope, are divided up into smaller vesicles. These are filled with coagulated material, in which are embedded a number of epithelial cells in various stages of mucoid degeneration. The nuclei of these cells are somewhat smaller than those seen in Slide 1. In some of the vesicles the cells are of a typical cylindrical type, arranged in rows in the usual manner found in adenocarcinoma. Nearly every cell contains a large vesicle apparently filled with mucoid material. In some of the vesicles the cells are scarcely discernible, only occasional chromatin granules and indefinite masses of protoplasm marking the site where the cells once existed. The stroma is thin, contains but few nuclei, and occasionally, at the intersections, a few fat cells and a well-defined round-celled infiltration. The nucleus of nearly every cell contains a deeply stained body (nuclear infection). The occasional

vacuoles filled with mucoid material present an entirely different appearance from possible Plimmer inclusions.

Slide 12, taken from a mucoid portion of the tumor, near the site of the original tumor. Material hardened in sublimate, stained with methylene-blue. The tumor is made up of large and smaller vesicles filled with mucoid material. Within the vesicles may be seen the remnants of adenomatous structures, the epithelium of which shows marked mucoid degeneration. Under high power the cells of this portion of the tumor are found to closely resemble the adenomatous structures seen in Slide 2.

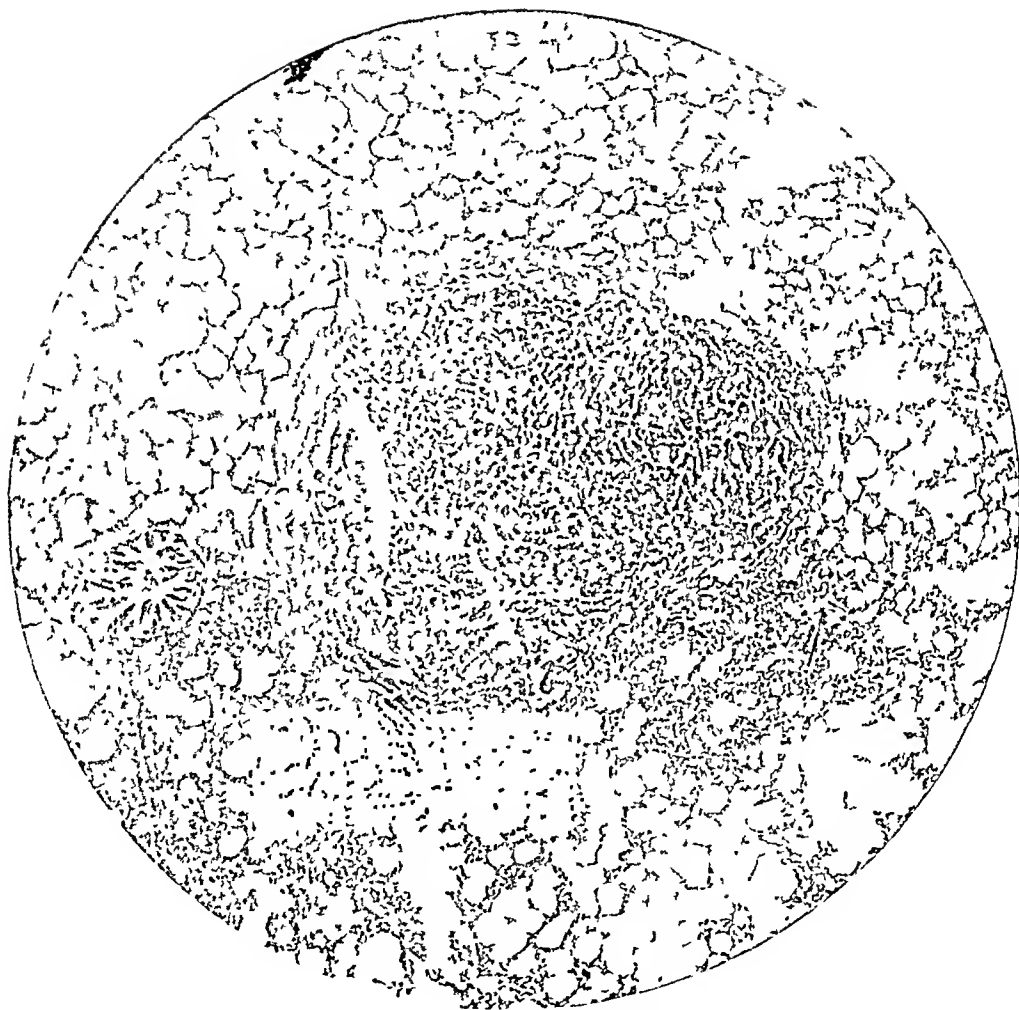
Slide 13. Section of a large mucoid mass removed from the under surface of the liver, stained with methylene-blue. The vesicles of this section contain deeply-stained masses of mucoid material. These are sharply delimited against the underlying structures. Embedded in the material are the fragments of degenerated epithelium. No well preserved epithelial elements are present. (Plate I., Fig. 2.)

Cultures made from different portions of the tumor were all bacteriologically negative. The usual forms of bacteriological culture media were employed. These were placed under aerobic and anaerobic conditions.

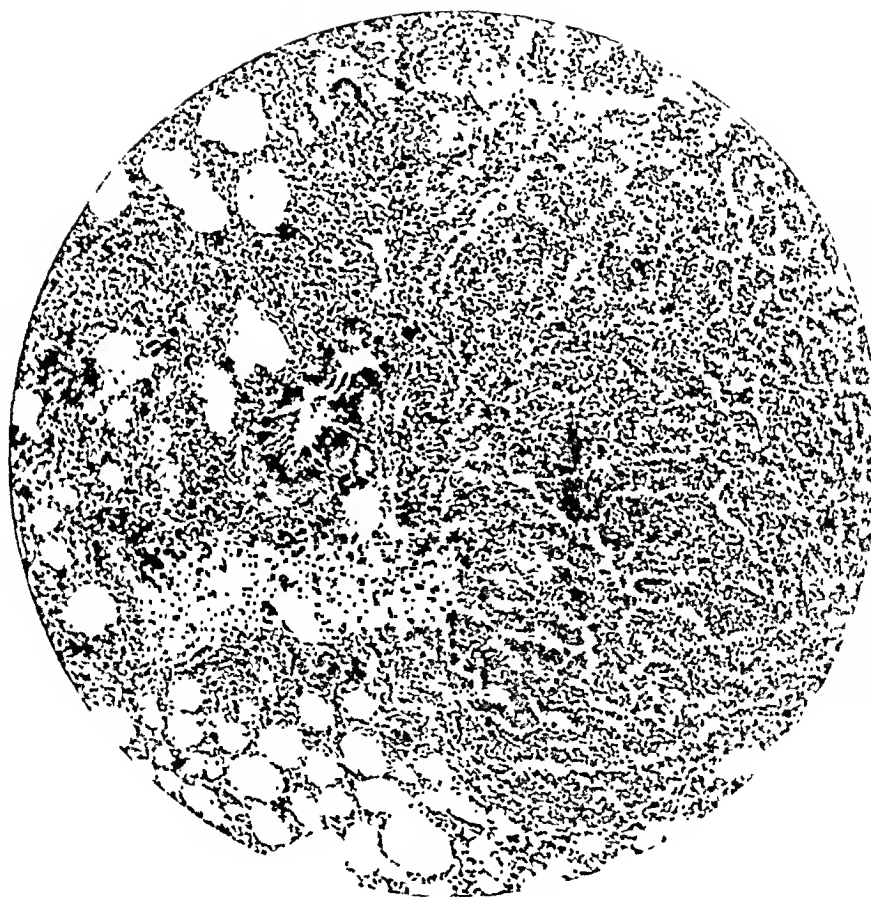
On September 6th the following note appears in the *Laboratory Journal*: "Guinea-pig No. 1 shows distinct evidence of listlessness and does not appear well. The animal sits in the corner of its cage and does not move about." On Wednesday, October 14th, both Pigs 1 and 2 were killed.

The following notes taken from the autopsy of Pig 1 will be of interest:

Inspection of the site where the injection of the serum was made in the right jugular shows that the superficial wound has healed, and at the point of ligation the jugular vein is transformed into a fibrous cord. On opening the thoracic cavity nothing of interest is to be noted until the lungs are reached. These are found to contain a normal amount of air. The pleura appears slightly injected. On opening the pleural cavity cultures are made from the lung surface. The lungs contain a large amount of pigment and show areas of venous engorgement with occasional minute hemorrhages beneath the pleura. After removing the lungs and incising them, both are found to contain a large number of minute nodules varying from the size of a pinhead to one larger than the rest, about the size of a grain of rice. These nodules are white, of greater consistence than the lung tissue, and somewhat elevated above the cut surface. Careful examination shows them to be located near or surrounding the small bronchi. The small areas of hemorrhage noted on opening the thoracic cavity are found to be confined to the region immediately beneath the pleura. On examining the abdominal organs the stomach is found to be empty, the intestines collapsed, the bladder widely distended with urine, and the cortex of each kidney of a deep red color. The capsules strip with some difficulty, and the stellate vessels directly beneath the capsule are slightly injected. The spleen is somewhat enlarged, shows a mottled, bright-red, and reddish-brown appearance. On incision the follicles are unusually large and stand out plainly against a background of deep red and reddish-brown pulp. Fresh microscopical examination of the heart's blood shows it to contain,



Section of Lung, Pig I, including the largest nodule Primary Adenocarcinoma following
injection of protozoa in peritoneal fluid of Case I. (Low Power)
(Haematoxylin Eosin)



Margin of nodule (Plate II) showing origin of tumor from
epithelium of bronchus. (Middle Power)

beside the normal constituents of the blood, a large number of small, spherical, highly refractive bodies closely resembling fat, which in size and appearance are identical with those found in the original fluid with which the animal was injected. Aside from the minute white nodules in the lung, the pigmentation and enlargement of the follicles of the spleen and lymph nodes, and the injection of the kidneys, the remaining organs of the animal show no abnormalities. The lungs were hardened in formalin.

A large number of sections were cut, some of which include the largest nodule above mentioned. On examination with low power of a section stained with Delafield's hæmatoxylin, the nodule is readily found by the deep staining of the structures which compose it. On closer scrutiny, even with low power (Plate II.), the structure presents the appearance of a rapidly-growing nodule possessing a definite structure. The lung trabeculae in the immediate neighborhood, especially in a portion adjacent to a bronchus, shows marked interstitial thickening. In the immediate neighborhood is a section of a middle-sized pulmonary vessel and a good-sized bronchus. The remains of a collapsed bronchial artery are seen just at the periphery of the growth. The alveoli of the lung show marked concentric flattening about the periphery of the nodule. A few yellowish-brown spots indicate the presence of pigment within the growth. Under high power the structure of the nodule becomes distinctly apparent. (Plate III.) It is made up of epithelial cells arranged in a characteristic manner upon a delicate connective tissue stroma. This forms the axes of longer and shorter papillary projections, which are closely packed together. Upon these are arranged single and double rows of cylindrical epithelium. At the periphery of the growth the alveoli of the lung are concentrically flattened, and the structure of the adenoma merges gradually into the structure of the lung trabeculae. In one or two points the adenoma is spreading into the surrounding tissues, and in these localities the trabeculae of the lung show a marked thickening and a distinct round-celled infiltration.

Under still higher power the nature of the epithelial cells may be more distinctly observed. They are fairly uniform in size, the cell protoplasm is abundant and palely stained. The nuclei are oval, are placed near the base of the cells, and stain deeply. The cells are cylindrical in form, but at the periphery, where the compression is great, they show evidence of considerable distortion. Included within the tumor are a number of cells containing coal pigment, and in the stroma are a few capillaries containing blood cells. In the neighborhood of these capillaries are occasional connective tissue cells loaded with hæmatogenous pigment.

The bronchial vessel lying directly at the margin of the growth is collapsed; the intima shows proliferative changes; the media is somewhat thickened. The adjacent pulmonary vessel is surrounded by a thick layer of cells, which apparently spring from the adventitia of the vessel. These are of the typical round-celled variety, and in certain portions are accumulated in groups, forming well-defined nodules. Careful scrutiny of the surrounding pulmonary tissue, especially in that portion in which there is great thickening of the trabeculae, shows this change to be due to a proliferation of the connective tissue stroma of the lung. A large number of cells closely resembling the *epithelial*

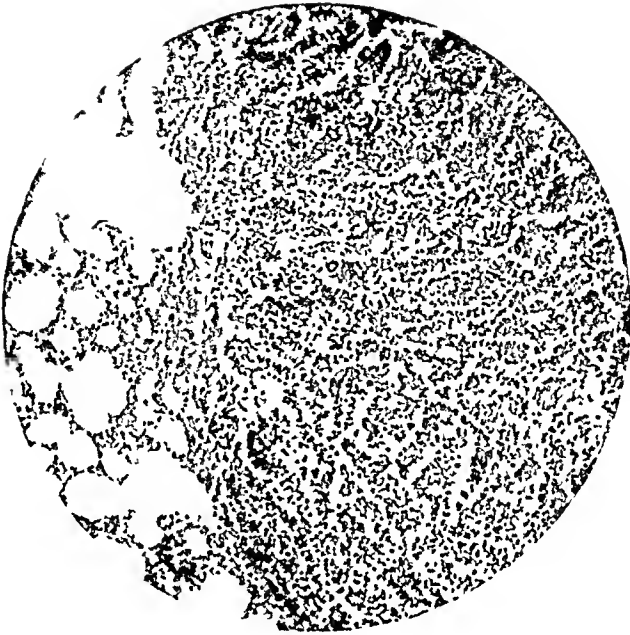
cells of the lung are mixed with these. A certain number of the last-mentioned elements contain deposits of coal-dust. An examination of the other pulmonary vessels of the lung reveals the same proliferation of the adventitia, and many of the smaller vessels are surrounded by nodes or rings of closely packed round cells. (Plate IV., Fig. 2.) In various other portions of the lung are areas in which the trabeculae are thickened or the alveoli completely obliterated. Within these areas will be found nests of epithelium, and in the larger, well-defined adenomatous structures identical in appearance with that of the largest nodule. (Plate IV., Fig. 1.)

Since the acquisition of Plimmer's method we have restained sections of this case, and find that every epithelial cell in the nodule contains a deeply stained nuclear body, which we now recognize as young parasites. The lung trabeculae are infiltrated with large numbers of young organisms, which can only be recognized from round cells by their form and homogeneous nature. They are either round or oval, or appear to have been hardened in the act of projecting pseudopodia. In some cases they are closely packed together, and a considerable number are found in the bloodvessels. By carefully investigating the different parts of the lung, it will be found that the epithelial infection, although present wherever nests of epithelium are formed, is not uniform, and that certain bronchi and areas of the lung have escaped. By such a comparison we may rule out the possibility of these bodies being due to a peculiarity of the staining method, and a careful comparison of a large number of sections shows that the presence of these bodies in certain localities, especially in the carcinomatous nodule, holds for all the sections made, although the staining method may have been slightly modified. Directly beneath the pleural surface are areas in which the alveoli are filled with blood and the capillaries are markedly engorged. These areas correspond to the small hemorrhages observed macroscopically.

Examination of sections of the spleen shows it to contain a large amount of brown pigment deposited in the pulp. Evidence of widespread hemorrhage is also found, and the follicles are markedly enlarged. (Plate V., Fig. 1.) In sections stained with Plimmer's method the nuclei of a large number of the cells of the follicles contain a deeply stained central body—in some cases spherical, in other cases of irregular shape. These we believe are young parasites. (Plate VI., Fig. 2.)

The pigment in the pulp takes the form of triangular and irregularly shaped plates, and is very abundant. The pulp contains a large number of lymphocytes and red blood-corpuscles. Scattered between the cells in the pulp are a large number of extra-cellular parasitic bodies, which conform in size to the pale forms which in the fresh state are capable of sending out pseudopodia. (Plate V., Fig. 2.) (Plimmer's stain.)

Summary of Case I.: The facts in this case may be summarized as follows: The primary growth was adenocarcinoma, probably having its origin in the appendix. This had spread, involving the greater portion of the peritoneal surface, with infiltration of the omentum and mesentery. The greater portion of the tumor had undergone mucoid degeneration, and the peritoneal cavity was filled with clear, straw-colored fluid. The patient was opened aseptically. A test-tube of this fluid, which was



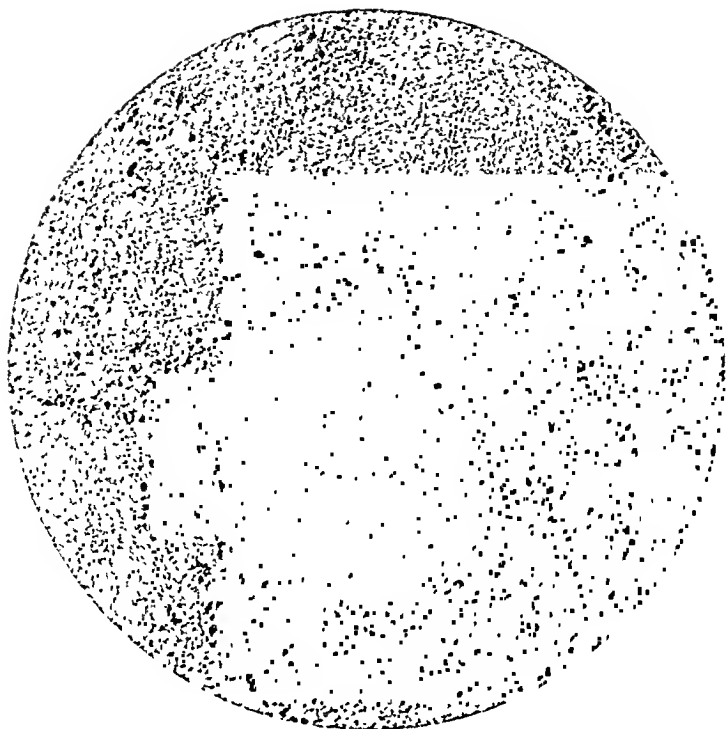
1.

Margin of smaller nodule, Pig I (M. P) (H. E)



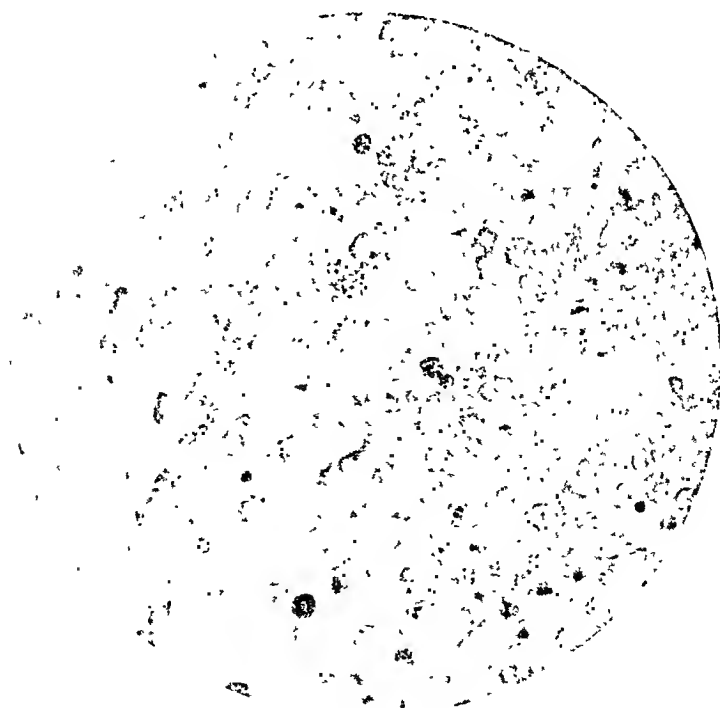
2.

Typical focus of round cells in perivascular lymph space of small vessel
Lung Pig I. (H. P.) (H. E)



1.

Section of spleen, Fig 1, showing enlarged follicles and haematogenous pigment deposited in pulp. (L. P.) (H. E.)



2.

removed through a sterile tube, and which remained bacteriologically sterile after an incubation period of thirteen days, contained a large number of small hyaline bodies, which were observed under the microscope to increase in size and change their form and pass through a cycle of development to what appeared to be a spore-forming stage, was injected into three animals—two, a dog and a guinea-pig, in the peritoneal cavity; one, a guinea-pig, in the jugular. The guinea-pig and dog which were inoculated in the peritoneal cavity developed no tumor formation, but a marked peritonitis and enlargement of the regional lymph nodes. The abdominal cavities of each animal contained a small amount of fluid; and in this fluid we were able to detect the characteristic spherical bodies, nucleated bodies, and sacs filled with the granules already described as being present in the primary case.

Slides taken from this fluid and incubated for a period of three or four days in the thermostat showed that the bodies not only changed their form, but we were able to trace the development of the larger structures from the small hyaline forms. Of particular interest was a portion of a slide so treated, in which we found numbers of the organisms which had sent out pseudopodia toward a neighboring air-bell. There were at least twenty organisms so arranged, and all of them had run out long pseudopodial projections to the margin of the air-bubble.

The animal injected in the jugular was killed after fifty days. On section the lungs were found to contain minute white nodules, which, on microscopical examination, proved to be beginning foci of adenocarcinoma. The pulmonary bloodvessels showed marked proliferation of the epithelial and adventitial cells. The spleen of the animal contained a large amount of blood-pigment, and the Malpighian corpuscles were enlarged. The cells of the tumor and those of the enlarged follicles in the spleen were each found to contain within the nucleus irregularly-shaped, deeply-stained bodies of unusual appearance. About the periphery of the follicles and scattered through the splenic pulp were a number of round and oval bodies, which corresponded morphologically to what are known as Russell's fuchsin bodies. In the perivascular lymph spaces of the lung we have since been able to detect, by employing Plimmer's staining method, the presence of the half-grown organisms in large numbers, which corresponded to those described by him as of constant occurrence in carcinoma in man.

Our attempts to cultivate these organisms at the time of this experiment were not followed by success, as the forms of culture media employed were unsuitable. As will be seen later, in the experiments which shortly followed upon the one just described we met with better success, and succeeded in cultivating with comparative regularity, directly from cancer, from fluids which were in contact with cancer, and from experimental animals, the organisms which have been

described in this first experiment. The medium which has thus far given us the best results is that recommended by Celli for the cultivation of *amœbæ*, fucus erispus bouillon.

Two other animals were inoculated at this time—one, a guinea-pig, in the peritoneal cavity, which was killed after nineteen days, and a dog which rapidly became emaciated and died after sixty-four days, presenting marked evidence of peritonitis with general enlargement of the regional lymph nodes, enlargement of the spleen, and œdema of the lungs. In the peritoneal fluid and the heart's blood, as well as from the organs of these animals, we were able to detect large numbers of the parasites. Sections of these organs, which have since been stained with Plimmer's method, reveal the presence of large numbers of the parasites in all of the viscera, however, especially numerous in the lymph nodes and lungs.

A number of tubes of the serum from this first case have been retained in the laboratory, and animals have been inoculated with them at later periods. Of special interest are Guinea-pigs 40, 42, and 43, which were inoculated with this serum which had stood for four months, with no other precautions being taken than placing the tubes which contained it in a cool place. The animals inoculated at this later period gave identically the same results as those of the original experiments.

During the period of these first experiments I was fortunate in having as an assistant Dr. F. C. Busch, who now occupies the chair of physiology in the University of Buffalo. Dr. Busch was of the greatest service to me, and assisted me in all of the work of that period with great skill and devotion.

Following these first experiments our efforts were especially directed toward an investigation of the fresh scrapings of cancers, and in attempting to demonstrate these bodies in the tissue in hardened sections. Having once established the fact that the small spherical bodies which so closely resemble fat were not fat (giving no reaction with osmic acid¹ and not being affected by fat solvents) we set about to determine how the great discrepancy between the large number of parasites found in fresh cancer and in sections could be accounted for.

A careful examination of a large number of tumors, including those removed by operation, shows that in all rapidly growing tumors, espe-

¹ In determining the relation of these bodies to osmic acid, fat was used as a control and placed under the same conditions. In one or two cases, after a treatment of one or two days with osmic acid, the writer has observed a slight browning of the periphery of these bodies, but fat used as a control had long before given the intense black reaction which characterizes it. We are not certain whether or not it is possible to cause a browning or possibly even blackening of these bodies by osmic acid if treated in some special manner. This question will be the subject of a special piece of research in the laboratory, but will in no way affect the significance of our findings. Sections hardened in Hermann's fluid in which the fat in the tissue gives the usual black reaction when cleared in oristanum oil and covered with a cover-glass without staining show bodies that are of a yellowish color.

cially when of large size, a great number of organisms are present. Small tumors, as a rule, were found to contain only the smaller forms of the organisms; the tumors and organs removed from eadavers of patients who had died from carcinoma or sareoma showed the presenee, especially in the tumors, of great numbers of the organisms in all phases of development. After comparing tumors removed by operation and those from eadavers it becomes evident that the organisms either increase very rapidly during the period just before death or that they proliferate in the tissues after death. In two cases of large-sized tumors, which immediately after operation contained a predominating number of the small forms of the organism, and which were retained sterile, we were able to make the following observations:

An examination of suceessive serapings from the tumor, several hours apart, in each case showed that the relative size of the organisms gradually increased. In the course of ten hours repeated serapings showed that the amœboid forms were greatly increased in number, and after twenty-four hours the spore saes of the organism were present, for the first time, in large numbers. Continuing our observation up to a period of about three days, we observed in these two cases that the sacs were ultimately replaced by groups of hyaline bodies, which were considerably larger than those which the sacs originally contained. It will be seen from this observation that the so-called fatty degeneration of eareinoma is at least in some part due to the presenee of the various forms of the organism which have been mistaken for fat droplets and infected epithelial cells which were supposed to be in an advanced stage of fatty degeneration.

We were likewise able to determine that in the centre of eareinomata which had undergone degeneration the fluid, the so-called cancer milk of the older writers, consists practically of a pure culture of these organisms. The fluid from malignant ovarian eysts likewise contains a large number of the organisms, and the peeculiarly characteristie mush found in the cavities of certain adenoeareinomata of the ovaries is likewise largely composed of the various forms of the parasite.

We were thus forced to conelude that bodies identical in appearance to those observed by us in the peritoneal fluid of our first case could be found in all serapings of cancer. The small, highly refractive form which in suspension possesses a characteristie oseillating motion, the larger pale forms projecting pseudopodia, and the saecular forms containing highly refractive spherieal bodies could be detected with equal facility in the fresh serapings of any malignant tumor. The small form of the organism which so elosely resembles fat, and the larger spherieal forms containing fine granules are partieularly abundant. By ineubating hanging-drop preparations of fresh serapings from cancer the smaller forms can be followed in their development, during which

they grow in size and finally become granulated, and, if kept upon a warm stage, ultimately throw out pseudopodia, develop a nucleus, and end by turning into a sac containing the spores of the organism. Owing to the fact that the specific gravity of the organism is less than water, it rises to the surface, and must be sought directly beneath the cover-slip and not in the lower portions of the fluid. This fact we had noticed and made use of before the recent publication of Funk on the vaccine organism.

Having ascertained that a large number of organisms were invariably present in cancer, we undertook to determine why these organisms could not be demonstrated with the ordinary staining methods in the tissues, and were able, first of all, to determine that the application of almost all fixatives caused the disappearance of all the spore sacs of the organisms, and the greater part of the large spherical and granular bodies. Only the small, more resistant forms of the organism remained, and these we were able to stain in a large number of sections with the aniline dyes, in which case they presented the form which has already been recognized and first described by Russell, known as "Russell's fuchsin bodies." The larger forms which are still hyaline in character or contain fine granules, and which might be spoken of as the quarter-grown organism, in sections stained by the ordinary methods so closely resembled free nuclei and round cells that it was impossible to state which were parasites and which tissue elements. In one case, however, of carcinoma of the bladder, observed during this period, where the organism appeared in large numbers in the urine, we were able to detect, even in hæmatoxylin preparations, the quarter-grown form of the parasite between the epithelial cells, and attached to the surface of the tumor after removal.

In the summer of 1898 the writer was asked to make an autopsy on a female patient who had died of carcinoma of the uterus. On opening the peritoneal cavity we were surprised to find an advanced general peritonitis. There was considerable clear fluid in the peritoneal cavity, and the surface of the peritoneum had lost its brilliancy. The intestines were matted together, and the thought was immediately awakened that a perforation of the vagina had probably occurred as the cancer involved the cervix, and that bacteria had entered the peritoneal cavity and had thus produced a secondary infection. On examining the spleen it was found that nearly one-half of that organ was in a condition of infarction; and on examining the lungs they were found to be markedly œdematous. Cultures for bacteria were made from the peritoneal cavity, the spleen, the blood, and the lungs, with the result which was determined later that they all remained bacteriologically sterile.

On returning to an investigation of the pelvic organs, we were immediately struck with the fact that there was no perforation, which at once directed our attention to the possibility that the case might be one

of general infection with the organism of cancer. For this reason we immediately made fresh preparations from the surface of the peritoneum, the substance of the spleen, the lungs, the heart's blood, and one of the larger superficial veins of the lower extremity. In all of these were found large numbers of the pale hyaline forms which we had already learned to recognize as constant in scrapings from carcinoma, in the peritoneal fluid of carcinomatous patients, and in the heart's blood and peritoneal fluid of our experimental animals. Dr. Irving Phillips Lyon, associated with the laboratory, was present with me at the autopsy, and confirmed my observations.

This was the status of our work in December, 1898, and it was upon the basis of these facts that the writer made the statement before the Medical Society of the State of New York, in January, 1899, which was quoted at the beginning of this paper. It will be seen from this statement that we believed we had recognized and demonstrated the presence of parasites in cancer and had successfully produced cancer in one animal, but that we were not at that time in a position to state what the nature of these parasites might be.

During the winter of 1898-99 the writer planned an elaborate series of experiments, based upon our original experiment, which are only just completed. With the clew afforded by the findings of the autopsy described above we have examined since that time the organs of a number of cadavers which have died from cancer, and on the bases of these observations we are prepared to state that *all the organs, including the blood taken from all regions of all cases dying of cancer, including sarcoma and epithelioma, contain large numbers of the organisms.*

Following the same lines, we have likewise observed *in all cases of carcinoma and sarcoma thus far examined in which cachexia was well marked, that the organisms, especially the younger forms, can be detected in the peripheral blood.* In these cases the smaller forms of the organism possess the peculiar oscillating motion already described. The quarter-grown forms of the organism are usually actively sending out pseudopodia, and conform very closely in appearance to the amœboid bodies found in the blood by Pfeiffer and Reed after vaccination and in cases of smallpox. (The question of the time of appearance of these organisms and the utilization of this fact as a means of diagnosis already forms the subject of a piece of research in the laboratory.) Animals may be infected by inoculating them with the peripheral blood from cachectic cancer cases when the serum contains the organism. In these cases the organism possesses great virulence. The younger forms of the organism may likewise be found in the peripheral blood of the animals after inoculation with cultures or carcinomatous material. Figs. 2 and 3, Plate VI., represent the larger hyaline forms of the organism from the blood of a case of fatal malignant lymphoma obtained seven days before death.

Having reported before the State Society our findings of parasites in cancer, it remained for us to determine the nature of these organisms and to continue our investigation in the most comprehensive manner possible. It became at once apparent that there could be but two possibilities in the case—either that the organisms were of an animal nature, and were then protozoa, or that they belonged in the vegetable kingdom, in which case they were in all probability low forms of fungi, probably yeasts. In order to understand the difficulties which prevented our arriving at an earlier conclusion as to the nature of these parasites it is well to review the status of scientific research at that time.

When, in 1898, the State of New York established a laboratory for the investigation of cancer, the attention of the scientific world was attracted by a series of five articles published by an Italian investigator, Sanfelice, of Cagliari, Sardinia, all of which appeared in the *Zeitschrift für Hygiene und Infektionskrankheiten*. Beside these, a number of articles appeared in different periodicals by a second Italian investigator, Roncali. These last are of less importance. The purport of the articles of both of these investigators was that the parasitic inclusions found in cancer were identical in appearance with yeast organisms or blastomycetes when injected into the tissues of animals. Sanfelice's articles went further, and in the twenty-ninth volume, 1898, of the above-mentioned journal, he published an account of tumors which he succeeded in producing by inoculation with a yeast in two dogs, both of which he wishes to designate as true adenocarcinoma forming metastases.

Before entering into a discussion of the merits of Sanfelice's investigations it is well to state that the first observer to interpret the spherical, hyaline bodies found in cancer as blastomycetes was Russell. Russell published an article in the *British Medical Journal*,¹ in 1890, in which he claimed that he had detected a micro-organism to which he gave the non-committal name of "fuchsin body." These were found in groups or clusters of from two or three to twenty or more. They were from four to twelve μ in diameter, were apparently homogeneous, and in some cases the groups of bodies were held together by a faintly stained material. He believed they belonged in the yeast group (*Sprosspilze*). Russell made no attempts to cultivate these organisms. His publication

LEGEND OF PLATE VI.

Fig. 1. Centre of follicle of spleen, Fig 1. A large number of cells contain deeply stained bodies within the nuclei (internuclear infection).

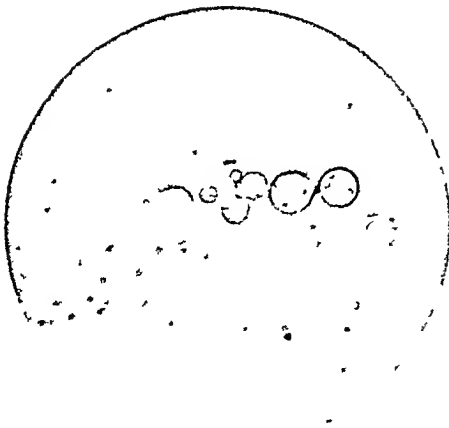
Figs. 2 and 3. Young forms of parasite from blood of case of malignant lymphoma. (Oil immersion, fresh preparation.)

Fig. 4. Very small and quarter-grown form of parasite from case of carcinoma of pylorus involving omentum. Culture obtained from fragment of metastatic deposit on focus crispus bouillon. (Oil immersion, fresh preparation.)

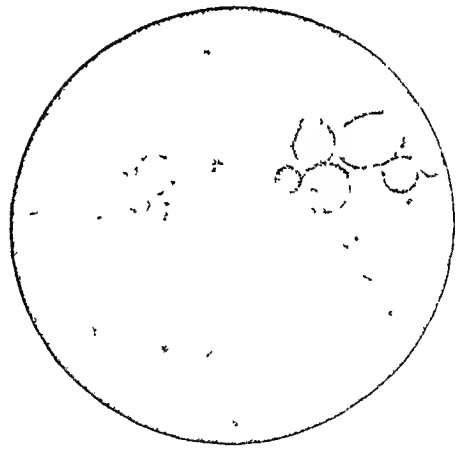
¹ An address on a Characteristic Organism of Cancer, December 13, 1890, vol. II., p. 127.



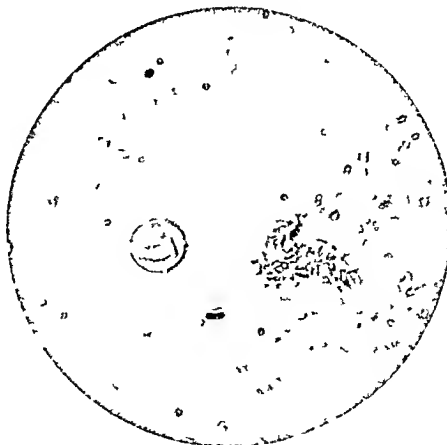
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2



3



4

led to very heated discussion, and his work was attacked, especially by Shattuck and Ballance, *British Medical Journal*, 1890, vol. i., p. 565, and Klein, *Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie*, 1891, Bd. xi. The first of these authors described similar bodies found in cascating lymph nodes and the walls of senile arteries, while Klein was of the opinion that Russell's bodies bore a close relation to Altmann's cell granulae.

In 1895 Busse, a German investigator, published the first description of an undoubted yeast, which he found to be the cause of a fatal infection in man. This organism he succeeded in isolating in pure culture, and found that the lesions which it produced were a combination of abscess and tumor formation ("Ueber Saccharomycosis Hominis," *Virchow's Archiv*, vol. cxl., p. 23). The appearance of the organisms in the tissue was so suggestive of the cell inclusions in carcinoma that Busse had previously published a description of the case under the title "On Parasitic Cell Inclusions and their Cultivation," in the *Centralblatt für Bacteriologie*, vol. xvi. The organisms were very commonly within the large cells which composed the walls of the abscess cavities, and under these conditions presented an appearance very much like the cell inclusions of carcinoma. In 1897 Busse published a monograph entitled *The Yeast Organism as the Cause of Disease*. In his last publication he is distinctly of the opinion that the pathogenic yeasts and the cell inclusions in cancer have no relation to each other. He describes a series of experiments which he carried out in the hope of causing proliferation of the cell inclusions of cancer. For this purpose he planted small portions of tumor in which he had detected the inclusions in various kinds of culture media, and placed them for several days in a thermostat. In none of these experiments was he able either to obtain a culture of organisms or to observe that the cell inclusion showed any evidence of increase in number or change of form. He likewise attempted to inoculate animals with small portions of lymphosarcoma, with negative results. He included a short description of all of the organisms of the same class described up to the time of his publication, and because of the negative results obtained and the fact that no positive evidence had been produced to show the identity of cell inclusions and yeast organisms, he concluded that they had nothing to do with each other, and that the yeast organism played no rôle in the production of carcinoma. Beside Busse, a number of observers have since described lesions of various kinds (especially skin lesions) produced by yeasts.¹

The articles of Sanfelice are of the greatest interest, as he has undertaken to elucidate the subject by a careful study of wild yeasts and

¹ Gilchrist: Johns Hopkins Hospital Reports, vol. 1. Gilchrist and Stokes: Journal of Experimental Medicine, 1898. L. Hektoen: Ibid., vol. iv., p. 261.

such as he found to possess pathogenic properties for animals. Among these was one obtained by cultivation from the skin of a lemon, which, when injected into animals, produced granulomata. These, in his opinion, closely resembled sarcoma, for which reason he gave the organism the name "saccharomyces neoformans." In 1898 Sanfelice published an account in which he stated that in his experiments he had inoculated, up to 1896, fifty-nine dogs. His method of inoculation he had varied as much as possible—some in the subcutaneous connective tissue, others in the testes, others in the breast, the spleen, the liver, the lungs, the jugular vein, and the peritoneum. Most of the animals showed no pathological change and were killed after three, four, and five months. In the greater number of these animals Sanfelice was unable to cultivate the organisms from the region of the inoculation, but in most cases he was able to secure them from the regional lymph nodes. By transferring his organism from dog to dog he succeeded in increasing its virulence to such an extent that, while in the beginning when injected into the jugular vein it produced no lesions, in the end similar inoculations resulted in the death of the animal, with the development of characteristic changes in various organs. Beside simple inoculations, he practised various methods to reduce the resistance of the animals, such as drawing a portion of their blood, injuring the tissues before inoculation, and introducing foreign bodies at the time of the inoculation. None of these devices produced any further results than those obtained by the simple inoculation. He ultimately succeeded in obtaining what he described as a positive result by inoculating a female dog with a culture of saccharomyces neoformans which had passed through a large number of dogs. A small portion of the culture was removed with a platinum needle, emulsified with sterile water, and injected into the breast with an ordinary sterile syringe. After the first few days the breast showed a certain amount of swelling and inflammatory reaction. *This disappeared after a few days and the breast presented a normal appearance.* After several months he observed that the breast in the neighborhood of the inoculation began to swell, and this increased gradually until a definite tumor was formed, which at the time of the death of the dog, ten months later, was about half the size of an egg. With the development of the tumor the dog showed definite signs of emaciation. The tumor was of greater consistence than the breast, and the nipple was retracted. The skin in one or two places was apparently adherent to the tumor. The inguinal lymph nodes on both sides were somewhat enlarged, the largest about the size of an almond, the smallest the size of a hazel-nut. The organs of the thorax and head showed no pathological changes.

Microscopical sections made through the tumor showed that the centre of the structure did not possess the same histological character-

isties as the periphery. At the centre the tumor presented the appearance of the normal breast of the dog. At the periphery the histological characteristics of the tumor were such, to judge from the description of the author, as to strongly suggest malignant change. Instead of the single layer of epithelium lining the spaces in the connective tissue stroma, which characterized the centre of the tumor, the portions near the periphery were lined by multiple layers of large epithelial cells. The nuclei were irregularly arranged, of varying size and form, and the membrana propria of the canals was missing. Isolated nests of epithelium were likewise to be found in the stroma. The epithelium exceeded in amount the connective tissue stroma. Sanfelice found that the enlarged lymph nodes on section presented the appearance of containing metastatic deposits of the large tumor. Sections cut from these lymph nodes showed that they actually contained epithelial structures of similar form and appearance to the peripheral portions of the tumor.

From the description of the tumor given, indicating the development of metastases in the regional lymph nodes, if the description of the author can be taken, there is little reason to suppose that the case was not one of true adenocarcinoma. *From the original tumor and all of the lymph nodes, Sanfelice was unable to obtain cultures of his organism, and neither in the metastatic deposits nor in the primary tumor was he able to demonstrate bodies which were unquestionably yeasts.*

Beside the case just mentioned, Sanfelice describes a second dog, which was inoculated in the testicles, and which, after a period of four months, had developed a well-defined enlargement of the organ and several nodular masses, which appeared to be enlarged regional nodes. Several nodular masses were found within the prepuce of the animal, and Sanfelice observed that from the orifice a small amount of purulent fluid could be expressed, in the cells of which he detected inclusions closely resembling the bodies of Russell, which he considered to be altered yeasts.

The animal died unexpectedly during the sixth month, and at the autopsy, which was performed with the assistance of Prof. Charbone (pathologist), the nodular enlargement of the testicle was found to be of yellowish-white appearance, of definite consistence, which could not be sharply differentiated from the tissue of the testicle. On both sides of the penis bone were a large number of apparently metastatic deposits—one of these as large as a hazel-nut, the majority about the size of peas. Surrounding the glands was a conical mass of newly-formed tissue, which communicated with the preputial opening. The primary tumor appeared to be in the testicle, and the smaller deposits appeared to be of a metastatic nature. The inguinal lymph nodes were slightly enlarged, and on section presented a normal appearance. The spleen,

kidneys, and liver were slightly hyperæmic, but showed no other changes.

As the autopsy revealed no well-defined cause for the exodus, the decision was reached that the animal had been surreptitiously poisoned. Cultures which were made by emulsifying portions of the tumor and metastases were all negative. Portions of the tumor were used to inoculate other animals. At the time of the publication Sanfelice was not in a position to state the outcome of these experiments. Sections of the tumor showed it to be very probably of epithelial nature. The cells of the tumor were rather small, and closely resembled those of the basal cells of the seminal vesicles of the dog.

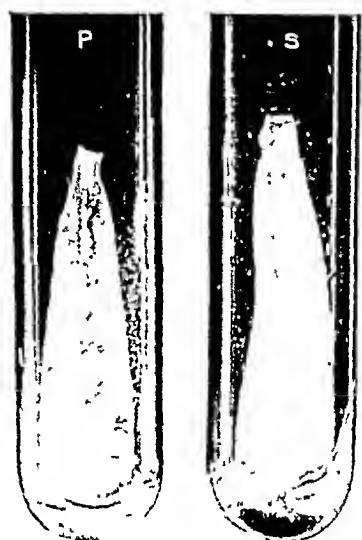
In 1898 the writer had the pleasure of making Prof. Sanfelice's acquaintance and carefully going over with him the sections from these two cases and obtaining from him a culture of the *saccharomyces neoformans* and blocks of tissue from the two tumors. It is important in estimating the work of an observer to know something of his character and temperament, and for that reason it was a great pleasure to make Prof. Sanfelice's acquaintance. He is a man of unquestionable sincerity and honor, and no matter what the interpretation of the work which he has published may be, his statements can be accepted as accurate so far as observation can make them. There is absolutely no question that the tumor of the breast with metastases in the regional lymph nodes, described by Sanfelice, would pass muster as an adenocarcinoma.¹

The courtesy which Prof. Sanfelice showed me in placing before me and at my disposal all of his material has been of the greatest service to the laboratory, and I wish to take this occasion to publicly thank him for his courtesies. The culture which he forwarded to us was that of an ordinary yeast, so far as we are able to classify it. The appearance of the culture and of the fresh organism is shown in Plate VII., Figs. 1 and 2.

The publications of Roncali have been confined to the description of attempts to cultivate yeasts from carcinomata. He describes several successful attempts in which he employed acid sugar-water as the medium. The writer was not deeply impressed with the preparations which Prof. Roncali showed him, and, as his cultivation experiments are so widely at variance with those of other observers and ourselves, we feel that they do not require a detailed description.

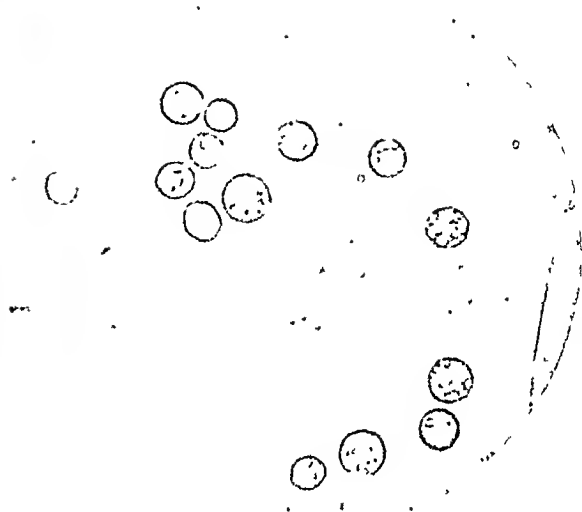
In the April number of the *Practitioner* for 1899 there appeared an article by Plimmer which is without doubt the most important communication in a number of that journal devoted entirely to the subject of cancer. After a short review of the literature, and an analytical discussion

¹ The probable significance of these experiments will be considered in Part II. of this article



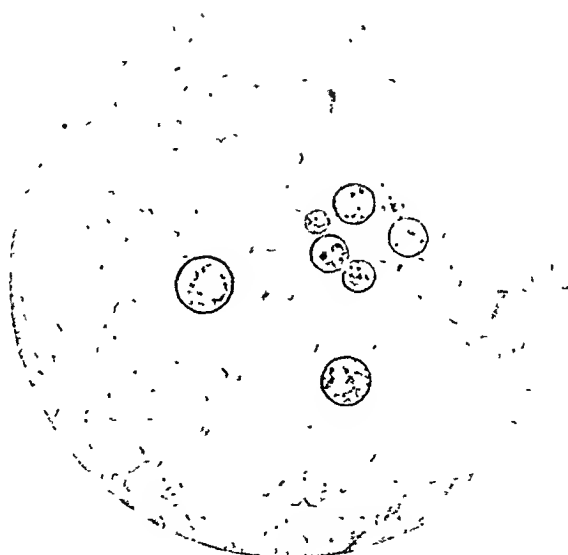
1.

Potato cultures of Plimmer's yeast
and Sanfelice's "Saccharomyces
Neoformans"



2.

Fresh preparation of "Saccharomyces Neoformans,"
Sanfelice. (Oil immersion.)



3.

Fresh preparation of Plimmer's yeast. (Oil immersion.)

of the structure of cancer, Plimmer gives the method by which he has examined a large number of cancers of various types. He recommends various hardening and staining methods for the demonstration of cellular inclusions, and, as in our experience one of these methods gives pre-eminent results, it would seem desirable to introduce it at this point:

1. Small slices of tissue are hardened in Hermann's fluid twelve to twenty-four hours.

2. Thorough washing in running water, twelve to twenty-four hours.

3. Harden in alcohol; embed in paraffin.

4. Remove paraffin in xylol.

5. Absolute alcohol.

6. Place in peroxide of hydrogen until the black is removed from the section and no further bubbles form upon the surface, one-quarter to half an hour.

7. Wash in water.

8. Stain with Haidenhain's iron hæmatoxylin or Mallory's simple iron hæmatoxylin.

9. Thorough washing in running water three to six hours.

10. Stain in 1 per cent. Ehrlich's neutral red or Bordeaux red. (This solution must be kept neutral. When it becomes acid it must be neutralized with alkali.) After staining with iron hæmatoxylin the differentiation must be continued until the protoplasm is colorless. The amount of red in the preparation must be controlled under the microscope.

Parasitic bodies in cancer and yeast organisms in the tissue are stained yellowish-red to coppery-red; nuclei, blue-black; connective tissue structures, brilliant red. Plimmer's description of the bodies is as follows:

"The parasites, as they most often occur, are round bodies of very diverse sizes, from 0.004 mm. to 0.04 mm. or even more in diameter. There is a central portion which I shall call here for convenience the nucleus, although there is nothing in this central portion in common with the biological nucleus, which is generally round, but which may be irregular in shape; around the nucleus is a layer of protoplasm, and outside of this is a capsule. This nucleus differs in its microchemical reactions from the nucleus of the cell; it takes, with the Ehrlich-Biondi solution, a copper-red color; with thionin, a dark purple; and with (1) of the double hæmatoxylin stains, described on page 440, it also takes a copper-red color, quite different from the red of either the protoplasm or the fibrous stroma; and with (2) it takes a dark claret color, again darker than that of the protoplasm or stroma. With the Ehrlich-Biondi stain it reacts somewhat like the nucleolus of the cancer-cell nucleus, but the color of the latter is much brighter; moreover, with many other stains—such as aniline-blue or *bleu de Lyon*, aniline-

green—it does not, as does the nucleolus, lose the stain when washed with spirit, but retains it even after immersion. This is to be remembered against the assertion that these bodies are aberrant nuclear structures. In very perfectly fixed specimens a lighter spot can be observed in the nucleus, which is not visible in fresh specimens; but in fresh specimens the nucleus appears to be larger than in fixed ones. It is to be noted that the nucleus is practically refractory to hæmatoxylin used in the strongest manner possible, when this is done by the ordinary methods. This, again, is very important in connection with the statement that the bodies are nuclear structures.

“The layer of protoplasm around the nucleus is generally homogeneous, and stains much less deeply than the nucleus. With alcohol fixation, again, the phenomenon of metachromatism is sometimes seen, the protoplasm staining blue with the Ehrlich-Biondi mixture. When the parasite has attained a certain size a rayed appearance is often seen in the protoplasm, but I have never seen this in the fresh state, and think it may be due to the fixative.

“The capsule is a very well-marked structure, which can be seen well both in the fresh as well as in fixed specimens. That this capsule is a part of the parasite can be demonstrated by the fact that it can sometimes be seen folded over on itself, and sometimes from fixation it shrinks away from the protoplasm of the cell, and also the parasite can sometimes be seen free in an alveolus with its capsule around it. It stains more definitely than either the nucleus or protoplasm; with the Ehrlich-Biondi mixture it is a brighter red than either of the other structures; with thionin it is darker; with hæmatoxylin, acid fuchsin, and orange it is a clear, bright red, and with hæmatoxylin and Bordeaux red it shows best as a very bright red line.

“This description applies to the forms most commonly met with, but there are some other forms which are met with, especially in cancers of rapid growth; they are, however, rare, so I will merely tabulate them:

“1. The form described above, in which the nucleus has attached to it a small body with similar reactions—i. e., reproduction by budding.

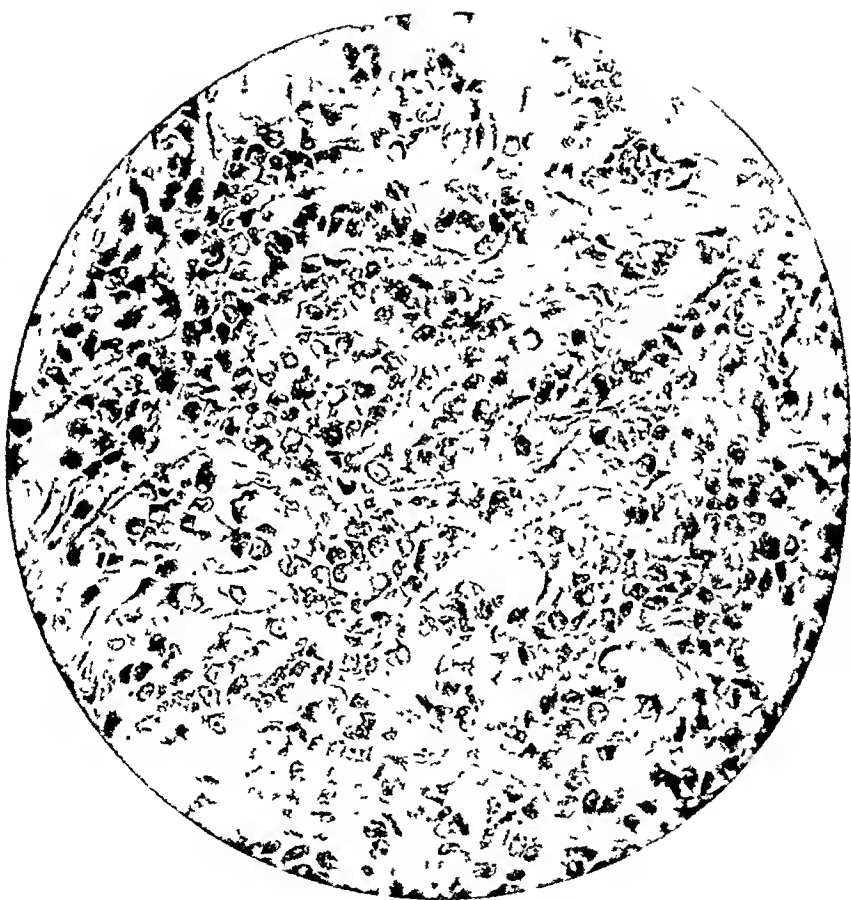
“2. A very small form, consisting of a capsule with a small central dot, staining similarly to the nucleus of the larger forms.

“3. A larger form, consisting of a capsule in which are two large dots in one diameter, and two smaller dots in another diameter at right angles to the first.

“4. A larger form again, consisting of a fine capsule, in which are a number of fine dots, not arranged systematically.

“5. A still larger form, consisting of a well-marked capsule, in which is a central nucleus with generally six smaller dots arranged around it.”

Plimmer states that during a period of six years he has examined microscopically 1278 cancers. These did not include any cases of sar-



Section of rapidly growing carcinoma of breast (Original preparation from Hunter stained with Plummer's method) Nearly every cell contains a Hammar body (inter cellular protozoa) (Low Power)

eoma. In 1130 of these cases he found parasitic bodies which come under the heading of those just described by him. His list included cancer of the breast, skin, including tongue and penis, uterus and vagina, stomach and intestines, liver, pancreas, lung, bladder, and glands. The parasites were not found in all portions of the cancer, but were usually present at the growing edge, and in the degenerated portions of the growths they were absent. They appear only in the bodies of active cells, and not in those which show retrograde or degenerative changes. They may be found free lying between the cells and having the same reactions as those which are included within the cell protoplasm. They may also be found in leucocytes. They did not appear in anything like equal numbers in all cases. Generally speaking, in most cancers they were comparatively few in number, but in some very rapidly growing cancers they could be found in enormous numbers, as in the case which he illustrates. He states that in his entire list he has only nine in which there were a large number of parasites; but in these cases there was scarcely a cell which did not contain one or more or even as many as sixty parasites. He states that he has likewise examined a large number of other pathological conditions with a view of determining whether similar bodies could be found. These structures included gummata, histoid tumors of all kinds, tubercular growths, glanders, actinomyetotic growths and tissues which had been irritated, as well as normal tissues, and concludes by stating: "I have never in man, in any instance, seen any intracellular or extracellular bodies which were like the parasitic bodies described above, or which had their reactions."

The sixth portion of Plimmer's article is devoted to a description of attempts to cultivate the parasitic inclusions which he describes, and states that in the last case which he has investigated, and which contains a large number of parasitic bodies, he was able to isolate the organism which, in certain animals, was capable of causing death by the production of tumors in various parts. The primary growth was a carcinoma of the breast taken from a woman, aged thirty-five years. It had a history of only two months' duration, and was growing rapidly at the time of operation. Prof. Plimmer has been kind enough to present me a section from this case, a photograph of which is shown on Plate VIII. In cultivating the organism he employed a medium, the basis of which was an infusion of cancer prepared according to the formula employed for ordinary bouillon, and to this was added, after careful neutralization, 2 per cent. of glucose and 1 per cent. of tartaric acid. Into this were introduced small pieces of the growth, cut with all possible precaution against contamination, and the inoculated tubes were placed under anaërobic conditions. After three to five days in three of the flasks inoculated he found a culture of an

organism which undoubtedly belongs in the yeast group. We are again indebted to Prof. Plimmer for a culture of this organism. When grown upon ordinary culture media it is that of an ordinary yeast (see Plate VII., Fig. 1). Its histological characteristics are shown in Plate VII., Fig. 3.

I wish to thank Prof. Plimmer for the courtesy which he has constantly shown our institution, both by communicating to us the result of his more recent work and by supplying us with sections and cultures.

Beside Plimmer, several observers claim to have been successful in the cultivation of yeast organisms from cancer. Kahane obtained a culture of blastomycetes from a cancer of the uterus; Mafucci and Sirleo have obtained cultures from malignant tumors, but their results were mostly negative; Corselli and Frisco report a case of sarcoma of the mesenteric glands, from which they isolated a blastomycetes. They obtained the organism during the life of the patient, and after death from the fluid in the abdominal and thoracic cavities. This is apparently a case of true yeast infection. Curtis has reported a case of myxomatous tumor in man, from which he obtained a culture of a blastomycetes, which after inoculation produced a similar tumor in a rabbit. Sawtschenko, who published an article in the *Bibliotheca Medica*, 1895, on "Sporozoa in Tumors," states that on a further consideration of his specimens he is now inclined to believe that they are altered yeast organisms. Anna Steckson, in an article on "The Blastomycetes of Curtis and its Relation to the Etiology of Tumors," Stockholm, 1900, states that she has cultivated blastomycetes from five cases of carcinoma. The organisms grew on all the ordinary forms of culture media.

In reviewing Plimmer's work the following points present themselves:

1. Can the bodies differentiated by Plimmer's methods and found by him in a large number of cancers be demonstrated in all cases of carcinoma?

2. Is their morphology constant and do they present characteristics by which they can be invariably recognized?

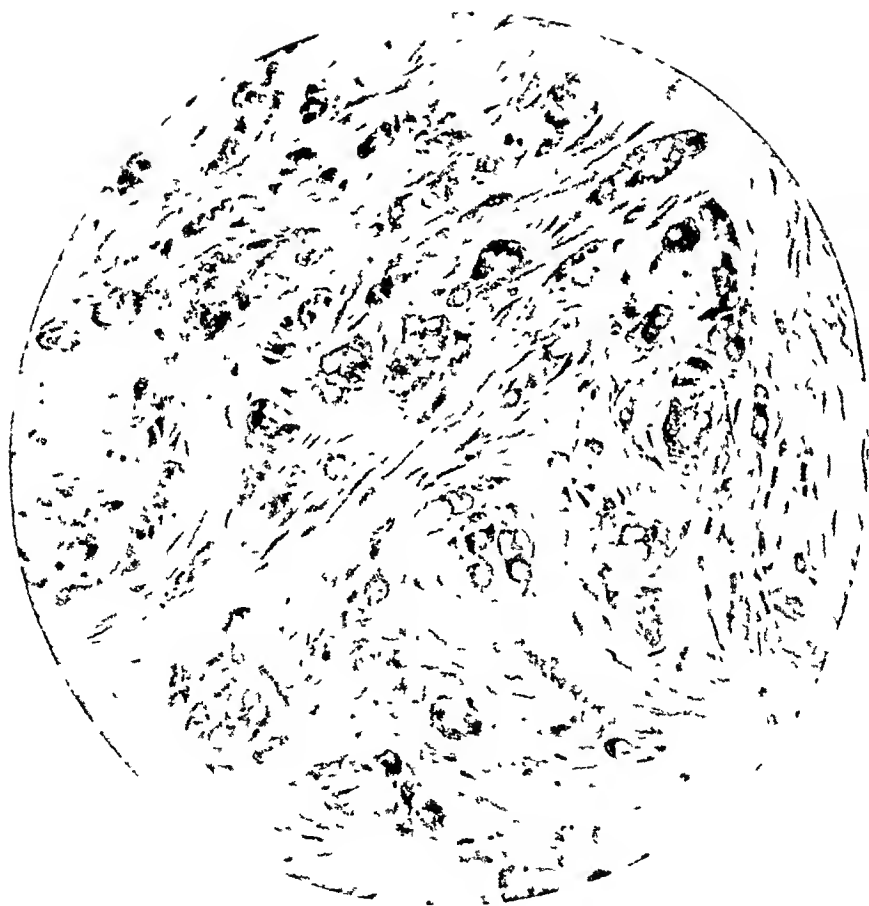
3. Can they be explained as changes in the protoplasm due to degeneration or other causes?

4. Are there morphological and biological grounds for believing that they are altered blastomycetes?

5. Do they bear any relation to the parasites described by other authors—i. e., Russell's bodies and the various cell inclusions interpreted as protozoa?

To determine whether Plimmer's bodies are constant in all malignant tumors a systematic investigation was undertaken immediately after the publication of Plimmer's article. The writer obtained from Prof.





Section of rapidly growing carcinoma of breast (Case 113, Buffalo). The magnification is the same as Plate VIII. Nearly every cell contains a parasite. Many cells contain more than one.

Plimmer sections from the case he had published, in which the organisms were stained, which were used for comparison, and a detailed account of his staining method was obtained in person. It will be noted in referring to Prof. Plimmer's article that he failed to mention in the description of his method for the demonstration of the bodies the peroxide treatment of the sections which is step six of the method. This is an extremely important point, and may have led to negative results with those who have adhered strictly to the method as published in the *Practitioner*. We do not know how Plimmer came to overlook this step in his publication, or how important he regarded it, but in our experience it seems to be distinctly fundamental, as the tissues do not take either the iron hæmatoxylin or the red satisfactorily when it is omitted.

During the past two years a large number of tumors, both malignant and non-malignant, as well as tissues not related to tumors, have been hardened and stained according to Plimmer's methods, and a large number of sections from each case have been carefully scrutinized. *The results of our observations completely substantiate Plimmer's claim that these bodies are present in all carcinomata.*

In tabulating the results we have used the terms "present" and "absent," and under "present" have classified the number of bodies encountered as "few" and "occasional." Under "few" is meant only one or two organisms to a section, or less than one organism to a section. "Occasional" means eight or ten or more to a section. The results of our investigation in this direction are shown by the accompanying table:

TYPICAL PLIMMER'S BODIES, INTERNUCLEAR PROTOZOAN FORMS, AND
RUSSELL'S BODIES.

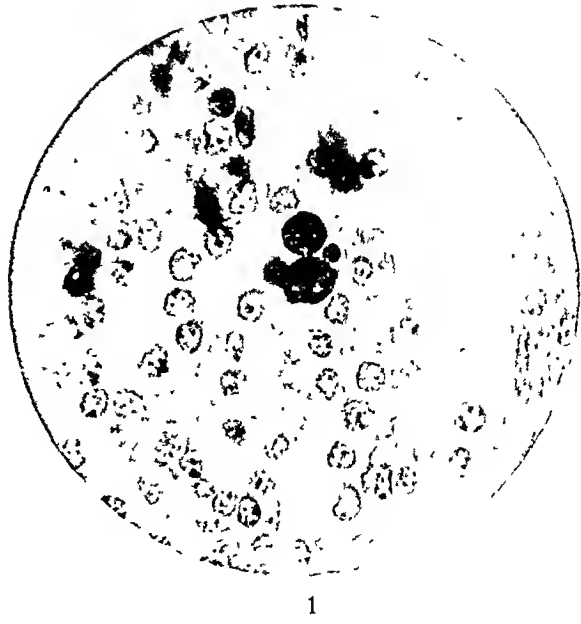
	Present.		
	Few.	Occasional.	Absent
Soft carcinoma of breast, primary, skin unbroken . . .	8	5	...
Adenocarcinoma of breast, primary, skin unbroken . . .	1	...	...
Soft carcinoma of breast, with metastases in axillary lymph nodes	2	1	...
Recurrent soft carcinoma of breast . . . . .	...	2	...
Ulcerating scirrhus carcinoma of breast	1	...	...
Large fungating carcinoma of breast . . . . .	...	1	...
Rapidly growing primary soft carcinoma of breast contained Plimmer's bodies in great number; nearly every cell contained one or more well-defined bodies except in the central degenerated portions of the tumor. See Plate IX. . . . .	...	1	...
Scirrhus carcinoma of the breast, material from which was not fresh . . . . .	...	...	1

	Present.		
	Few	Occasional.	Absent
Carcinoma of stomach . . . . .	...	1	...
“ “ “ metastases in liver	1	...	...
“ “ “ in mesenteric lymph nodes . . . . .	...	1	...
“ “ pylorus	1	...	...
“ “ “ metastases in mesenteric and omental lymph nodes . . . . .	...	1	...
Adenocarcinoma of rectum with metastases . . . . .	...	1	...
“ “ of colon	1	...	...
“ “ of appendix, with mucoid involvement of peritoneum; in undegenerated portions of tumor	1	...	...
Mucoid carcinoma of cæcum, involving peritoneum, in undegenerated portions of tumor	1	...	...
Adenocarcinoma of cæcum	1	...	...
Carcinoma of gall-bladder	2	..	...
Secondary carcinoma of liver, ox, only organ examined	1	...	...
Carcinoma of omentum	1	...	...
Adenocarcinoma of uterus	1	...	...
Solid soft carcinoma of uterus . . . . .	...	1	...
Adenocarcinoma of ovary	2	1	...
“ “ “ protozoan forms in large numbers. (See Plates XI. and XII.)	1	...	...
Case of general carcinosis involving liver, lung, heart, and kidneys, a very acute case	1	...	...
Primary adenocarcinoma of kidney, pig	1	...	..
Hypernephroma from man	2	...	...

RUSSELL'S BODIES, MODIFIED PLIMMER'S BODIES, PROTOZOAN FORMS.

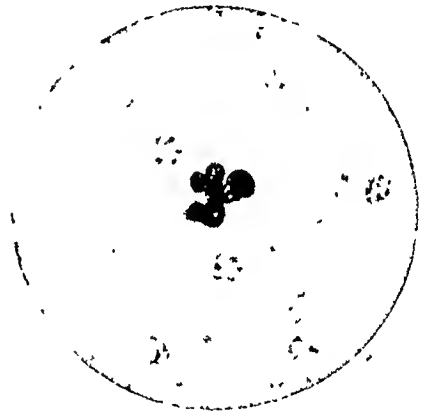
	Present.		
	Few.	Occasional.	Absent.
Squamous epithelioma of skin . . . . .	...	1	...
“ “ “ cheek . . . . .	...	3	...
“ “ “ lip . . . . .	...	3	...
“ “ “ tongue . . . . .	...	2	..
“ “ “ penis . . . . .	...	1	...
“ “ “ cervix . . . . .	...	2	...
“ “ “ vagina . . . . .	...	1	...
Squamous epithelioma of orbit, cow; a few atypical bodies giving the reaction of Plimmer bodies, but much larger. (See Plate XIII., Fig. 1)	1	..	...
Multiple sarcoma of skin	1	...	...
Melanosarcoma of skin	3	...	...
Large spindle-celled sarcoma	1	...	...
Spindle-celled sarcoma, metastases in myocardium, horse	1	...	...
Sarcoma of kidney, rooster	1	...	...
Recurrent sarcoma of thigh	1	...	...
Sarcoma of breast involving thoracic wall, dog	1	...	...
Angiosarcoma of brain	1	...	..

Russell's bodies from carcinomatous
lymph node.
(Oil immersion.)
(Plimmer's method)



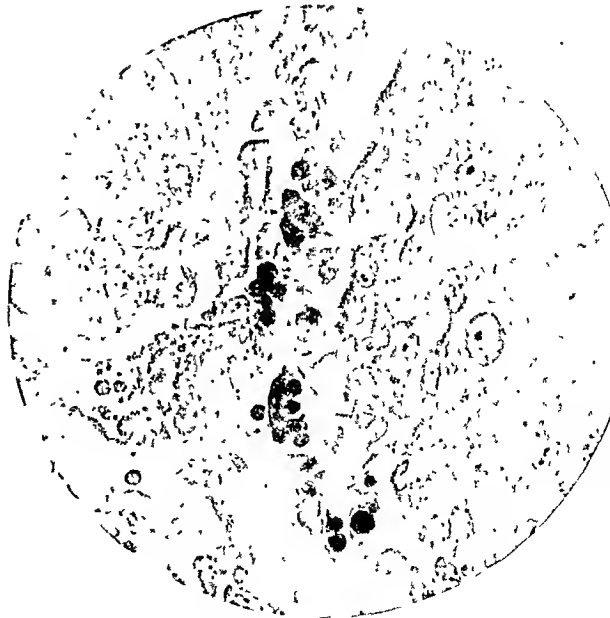
1

Russell's bodies from enlarged regional
lymph node. (Carcinoma of breast) (This
node was used to inoculate Dog 18.)
(Oil immersion)
(Plimmer's method)



2

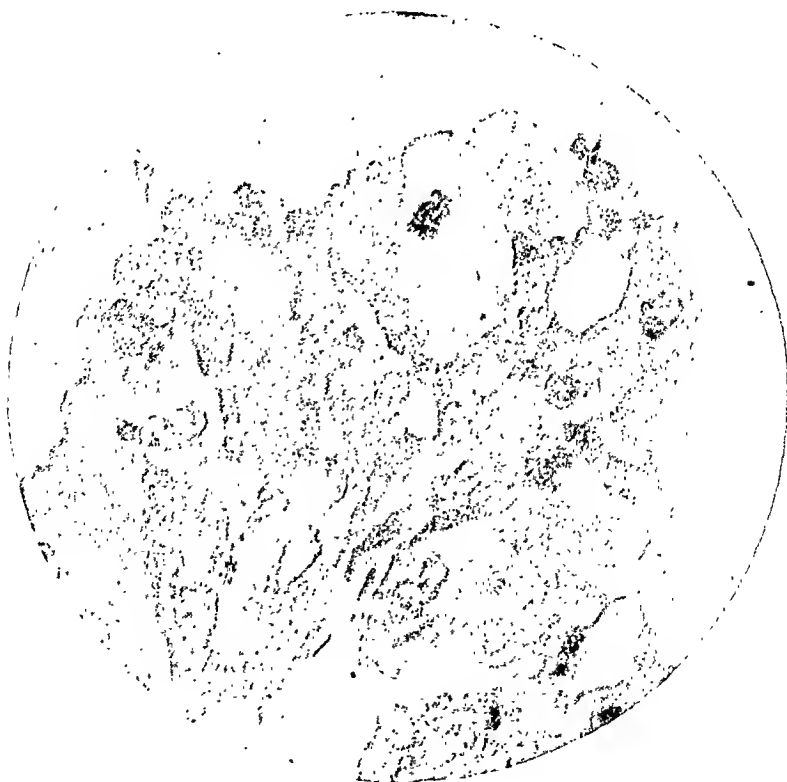
Groups of Russell's bodies from
margin of an epithelioma of skin.
(Oil immersion)
(Methylene blue.)





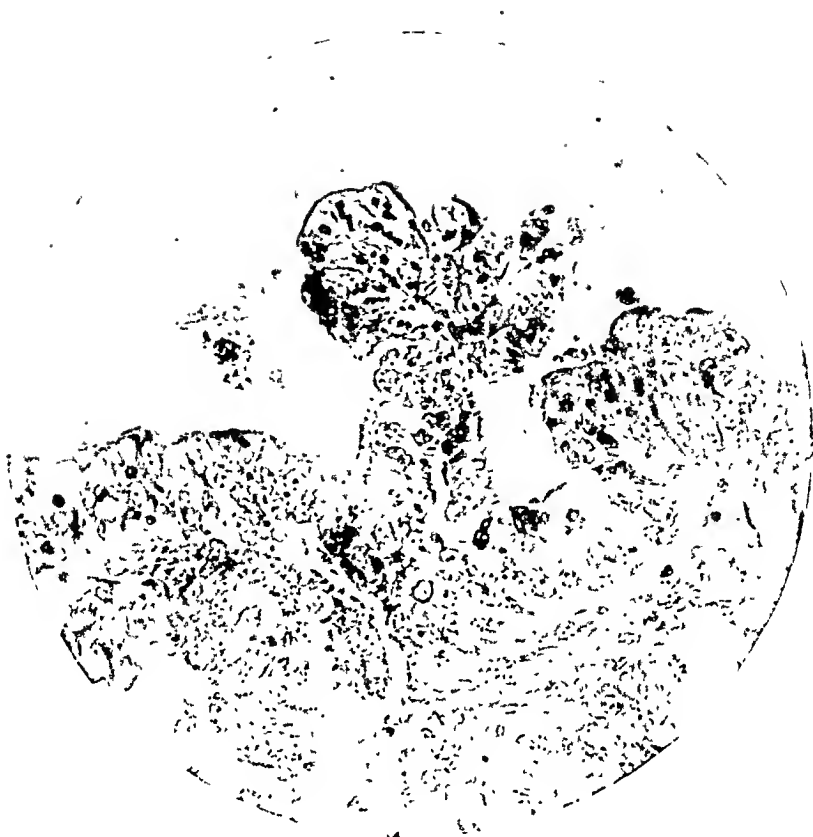
1.

Adeno carcinoma of ovary. Localization of young parasites (Russell's bodies) in the apices of the papillae. (Plimmer's method.) (M. P.)



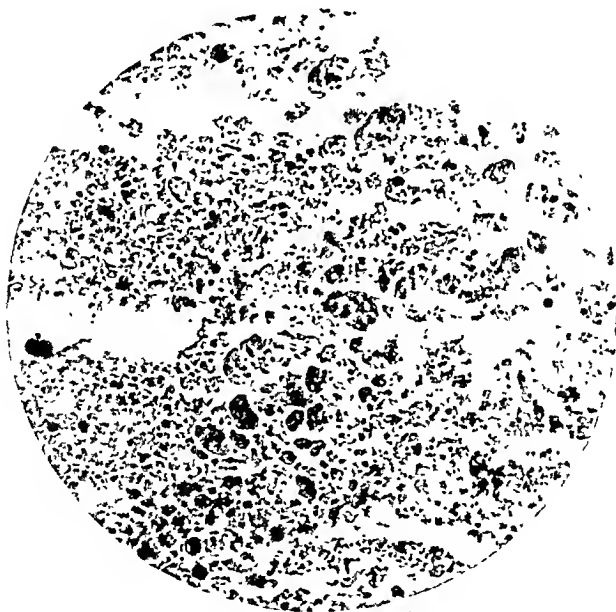
2.

Parasites with pseudopods extended. Same tumor. (Oil immersion.)



1.

Adenocarcinoma of ovary with inter-cellular parasites. (M. P.) (Plimmer's method.)



2.

Free parasites in cystic cavity of tumor. (M. P.) (Plimmer's method.)

	Present		
	Few.	Occasional.	Absent.
Round-celled sarcoma of ilium	1	...	...
Malignant lymphoma	1	...	...
Slowly developing lymphoma	1	...	...
Myxoma of breast	1	...	...
“ from pylorus of tiger shark (<i>Galeocerdo tigrinus</i>)	1	...	...
Osteosarcoma	1	...	...
“ “ of jaw, horse	1	...	...
Adenofibroma of breast, rapidly growing, both breasts involved (see text)	1	...	...
Lipoma of abdominal wall . . . . .	...	...	1
Fibroma from side of sucker (<i>Chasmistes</i>) . . . . .	...	...	1
“ of musculospiral nerve . . . . .	...	...	1
Colloid struma . . . . .	...	2	...
Tuberculosis of breast . . . . .	...	...	1
Chronic cystic mastitis . . . . .	...	...	1
Syphilitic lymph nodes ¹ . . . . .	...	1	...

In examining the above table it will be seen that in all cases of carcinoma investigated by this method, with the exception of one which was not fresh, Plimmer's bodies were uniformly present. Likewise in all of these tumors Russell's bodies were numerous, especially about the periphery of the tumors and *in the adjacent lymph nodes, even when these contained no epithelial deposits*. Such groups of Russell's bodies are shown on Plate X. One tumor, an adenocarcinoma of the ovary, beside containing typical Plimmer's bodies, contains a large number of cellular inclusions resembling Russell's bodies, and many larger forms which show evidence of previous amoeboid movement. These are the so-called protozoan forms of the earlier writers. It will be noted on Plate XI., Figs. 1 and 2, and Plate XII., Fig. 1, that these organisms have infected the epithelium at various points, and as a result of the infection a proliferation has occurred which has thrown the epithelium into folds giving the characteristic papillary appearance of such tumors. As a result it is to be noted that the parasites are present in greatest number at the apices of the papillary projections. The fluid in the cavity of this tumor appears to be nearly a pure culture of organisms (Plate XII., Fig. 2). This tumor was hardened immediately after the operation in sublimate, and was brought by the writer from Dresden, where it was obtained over three years ago. One of the cases in which Plimmer's bodies were found was a rapidly growing adenofibroma of the breast. *This case presented no histological evidence of malignancy, but occasional Plimmer's bodies were found lying in the stroma and between the cells of the acini, as well as a few in cells. The patient developed a similar growth in the remaining breast,*

¹ The organisms found in syphills closely resemble those of sarcoma. This phase of the question will be reported upon later.

which was likewise operated upon after it had reached a large size, and it likewise contained a few Plimmer's bodies.

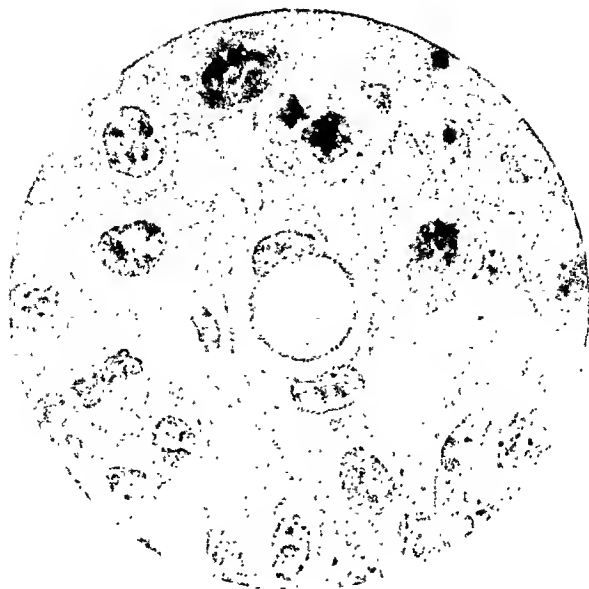
Beside these cases of carcinoma fourteen cases of squamous epithelioma were examined, and all of these contained *atypical bodies which gave the staining reactions of Plimmer's bodies, but were much larger and did not contain the characteristic central bodies.* The appearance of the cell inclusions from one of these cases is shown in Plate XIII., Fig. 1. The remainder of the list contains fifteen cases of sarcoma—eleven from man and four from animals—all of which contained the *small forms of the organism within the nuclei.* *Plimmer's bodies are rare, and not so well defined as in carcinoma.*

In comparing our findings with those of Plimmer, it will be seen that the results obtained by us completely substantiate his claim that typical bodies of the nature which he has described are of practically constant occurrence in carcinoma and sarcoma. Our list is not nearly so large as Plimmer's, as we have devoted our principal efforts to the experimental side of the problem, and simply wished to confirm or disprove Plimmer's results. We have not considered it necessary to examine a greater number of tumors than those employed for experimental purposes. Beside the tumors enumerated in this list we have examined a large number that were fresh, and have been able invariably to demonstrate the parasites in the fresh condition.

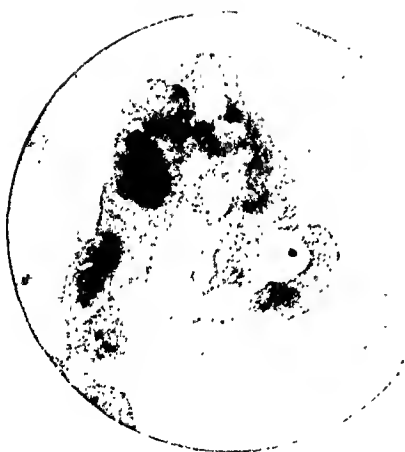
The recognition of the nature of these bodies and the demonstration of their presence in 88 per cent. of 1278 cases is a feat so colossal that it places beyond any question of doubt the significance of these bodies in the cancerous process. Not only should the credit of this performance be freely accorded to Plimmer, but we must also state that the acquisition of his staining method has thrown an entirely new light upon the animal experiments which we shall describe later, and has been one of the most important factors in elucidating the entire problem.

As to whether the morphology of these structures is sufficiently constant to enable their ready recognition the following can be stated:

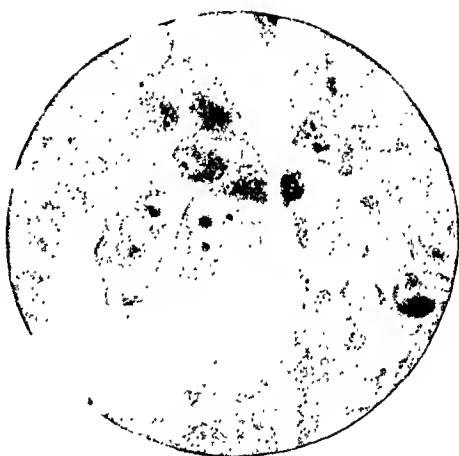
The bodies may be demonstrated in the fresh state, in which case it is a matter of considerable difficulty to distinguish them from fat droplets, which they somewhat resemble, but which have a higher refractive index and do not contain a central structure. The most minute form of the organism might be confused with cocci. In the fresh state the quarter-grown and half-grown forms appear either as spherical bodies with very delicate outlines and containing one or two colorless granules near the centre, or as similar structures of oval form. They may be either intracellular or extracellular. Occasional forms will be met in which the pale structure of the body is projected in the form of a pseudopod; in which case the granules may remain in the larger portion of the structure or one or two may be found in the projection.



1.



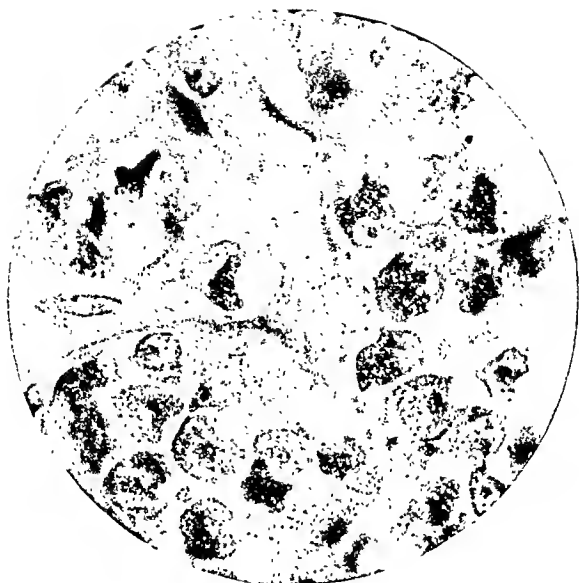
2.



3.



4.



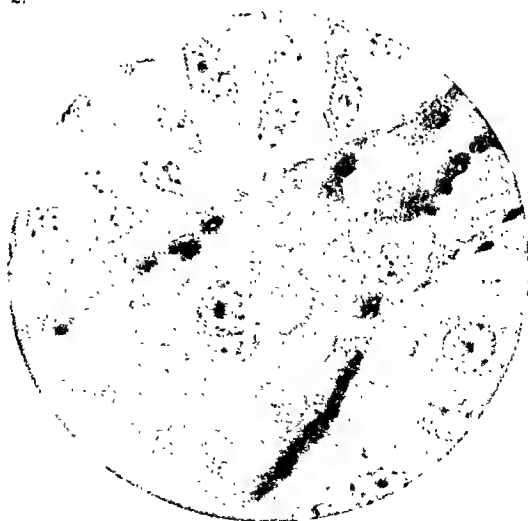
1.



2.



3.



4.

These forms closely resemble the bodies shown in Fig. 2 of the article by Sjöbring in the *Centralblatt für Bacteriologie*, vol. xxvii.

We have never been able to detect any change of form in the intracellular bodies, although scrapings from carcinoma in which they were found have been exposed to various procedures. The extracellular bodies may be occasionally induced to change their form by placing the preparation in a thermostat. In this case we have repeatedly observed that bodies which are spherical changed on the warm stage after a period of some hours, and projected longer and shorter processes. Attempts to stain them in the fresh state have met with varying results. They apparently take on Sudan III., but Dr. Clowes, the chemist of the laboratory, states that this is not a genuine staining reaction.

We find that the organism of vaccine may be stained in the same manner, and we are informed that others have employed Sudan III. as a stain for amœbæ.

Attempts to fix the organisms by heat gave unsatisfactory results, owing to the distortion which they undergo. If cover-slips be made and dried in the air the small, spherical bodies will stain with any of the aniline dyes. The larger forms, however, remain unstained, and appear as spherical or oval clear spaces in the stained material of the cover-slip. The best means to fix them is to make rapid smears after the manner employed in making blood-slips and drop the wet cover-glasses into warm Hermann's fluid or sublimate. They may then be stained with Plimmer's method. We have likewise found that pouring peritoneal fluid which contained them into warm Hermann's fluid or sublimate and treating the coagulum after the manner in which tissue is manipulated gives excellent results, the organisms retaining their form and characteristic appearance. (Plate XIII., Fig. 4.)

The best method for preserving the extracellular forms is by hardening masses of tissue which contain them. An excellent method for hardening the organisms with the pseudopodia projected has recently been described by Eisen in his very excellent article in the *Medical Record* of July 7th of this year. Dr. Eisen has been kind enough to forward us some of his sections, and we can heartily indorse what he has described in epithelioma.

In sections hardened in Hermann's fluid and stained with Plimmer's method the bodies correspond very accurately to the description given by Plimmer. Some of the different types which we have observed are shown on Plate XIII., Figs. 1, 2, and 3, and Plate XIV., Figs. 1, 2, 3, and 4. As to the staining qualities of the organisms, we find that they closely conform to those given by Plimmer—that is, that the central body and capsule of the structure take on a coppery-red or pale rose color. In the case shown on Plate XIII., Figs. 2 and 3, we have succeeded in staining the central bodies with the nuclear stain,

and in some of the cell inclusions only the central portion of the central body takes the nuclear stain, and is then surrounded by a layer of protoplasm, which takes the rose or pink color.

The organisms may appear singly in the cells, or even in large numbers. (Plate XIII., Fig. 3.) We have detected as many as fourteen in one cell. There is no difficulty in detecting the structures in properly hardened and stained material. They can be readily distinguished from vacuoles in the protoplasm by the well-defined capsule and central bodies, their relative uniformity in size, and occasional presence between the cells.

Summing up this phase of the question, it can be unhesitatingly stated that Plimmer's bodies present a characteristic appearance and can be readily differentiated from cell degenerations of the usual type and other structures which they might resemble.

To determine whether or not Plimmer's bodies could be due to cell degenerations, we have carefully examined a large number of sections of well known pathological conditions of known cause, such as tuberculosis and certain bacterial infections, and a large number of animals inoculated with various pathogenic yeasts, and we can state that we have never detected any changes in the epithelial or other cells in this class of diseases which could be confused with Plimmer's bodies.

In attempting to determine the nature of Plimmer's bodies, the fact becomes immediately patent, in reviewing the literature, that many observers have depicted these structures. Scarcely an article has appeared in which the observer has not, more or less accurately, illustrated cell inclusions which are no doubt the characteristic bodies of Plimmer. The slight variations which are encountered in these illustrations are very likely due to the different methods of hardening and staining employed by the different investigators, and the usual subjective equation incident to all illustration by drawings. Figures which are unquestionably intended to illustrate bodies of this nature may be found in a publication of Sawtschenko, *Bibliotheca Medica*, 1895, Abtheilung, D. ii., Heft 4. Those which most characteristically represent Plimmer's bodies are Figs. 18, 19, 30, 51, 57, and 60. In an article published by Jackson Clark, *Centralblatt für Bacteriologie*, vol. xvi., Fig. 6 of Plate III. is a most typical representation of these bodies, and, in like manner, an investigation will reveal more or less characteristic illustrations in the publications of the majority of investigators.

Of especial interest in this connection are the illustrations of Sjöbring accompanying his most recent publication in the *Centralblatt für Bacteriologie*, vol. xxvii. Fig. 1 of this article represents a section through the wall of a *vasa efferentia* in the epididymis. In the protoplasm of the epithelium are shown three typical Plimmer's bodies. This illustration is especially interesting, as the author states it is taken from the

epididymis of an animal from the neighborhood of a fragment of sterile carcinoma which had been implanted in the testicle.

It will, therefore, be seen that many of the observers who have described cell inclusions, in the belief that they were protozoa, have unquestionably seen typical Plimmer's bodies, and it would appear as if Sjöbring, in his most recent publication, was dealing with bodies of at least a very similar appearance.

In all the carcinomata which we have investigated we have found that Russell's bodies could be detected, especially about the periphery of the tumor and in the enlarged regional lymph nodes, even when these were not carcinomatous. In sections stained with Plimmer's method they take on a dense blue-black, but by modifying the stain they can be made a brilliant red, which gives them much the same appearance as they possess when stained with fuchsine. In one case we have succeeded in staining the central bodies of the Plimmer inclusions, and are able to trace a direct morphological relation between Russell's bodies and Plimmer's bodies. In one case of adenocarcinoma of the ovary, which contained a large number of Russell's bodies and protozoan forms, the bodies which correspond to Plimmer's bodies were more or less atypical, probably owing to the hardening agent (sublimite).

From the above it will be seen that Plimmer's bodies are not new structures, but that his hardening and staining methods give them a more characteristic appearance and probably differentiates them in a large number of cases in which, when treated by the ordinary staining methods, they would be invisible.

In form the bodies are almost always round or oval. Occasionally they occur in pairs, in which case they are usually smaller than the single bodies, and present an appearance which is highly suggestive of some form of division. Plimmer describes a budding form of the organism, which, in our experience, is very rare. We have found only one or two bodies which conform to this description.

The fact that certain observers have succeeded in obtaining pure cultures of blastomyces from carcinoma, and the significant experiments of Sanfelice, naturally raise the question as to whether these organisms can be detected in carcinomata. In the examination of our cases we have thus far failed to find any structures which we were willing to consider blastomyces. During the last two years we have carried out an elaborate investigation of pathogenic yeasts, including Plimmer's organism, Sanfelice's neoformans and lithogenis, the pathogenic blastomyces isolated from a skin lesion by Hektoen, and a similar organism isolated by Gilechrist and Stokes.

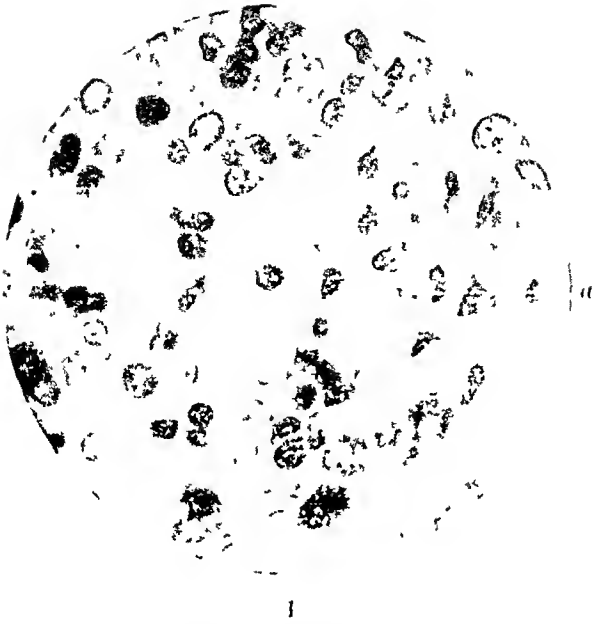
A summary of the results of a long series of comparative inoculations with these organisms, as well as a careful morphological comparison, will form the subject of a future publication from this laboratory. The

details of the results will not be entered into here. Suffice it to say that we have never detected a sufficient transformation in the organisms injected to give them an appearance identical with the Plimmer bodies of carcinoma. The nearest approach to such a result is shown in Plate XV., Figs. 1 and 2, which represents yeast cells (Plimmer's) in the lung of a guinea-pig, hardened and stained by his method.

Thus far the distinguishing feature which we have always observed has been the double contoured capsule of the yeast organism, which Plimmer's bodies do not possess. At the same time we have occasionally noted yeast organisms with a single contoured capsule; but in these cases they never presented an appearance which could be confused with a typical Plimmer body. Plate XV., Fig. 1, shows a yeast organism with a single contoured capsule, which, it will be noted, contains no central body. *From a morphological stand-point we have been unable to demonstrate the identity between Plimmer's bodies and transformed yeast organisms.*

The culture experiments in this laboratory have been of a uniformly negative nature. An elaborate bacteriological investigation was carried out by Dr. Pease, former bacteriologist to the laboratory, at the time the tumors were being investigated for the presence of Plimmer's bodies, and in only one case did he succeed in obtaining a culture of a blastomyces. In order, if possible, to find a suitable medium for the blastomyces, in case the negative results were due to unsuitable substrata, we prepared and employed sixty-four different varieties, which it may be of interest to enumerate. In this list the term + is used to indicate acidity, and — alkalinity. The figures indicate the units of acidity and alkalinity recommended by the bacteriological committee.

Bouillon neutral.	Milk.
" + 15.	
" + 5.	Serum bovine.
" — 15.	" human.
" sugar (free).	" dog.
" glucose.	" aseptic.
" lactose.	" hydrocele.
" saccharine.	" abdominal fluid.
" glucose—tartaric acid.	
" pig liver.	Urine.
" " liver—cancer.	
" " kidney.	String-beans in aqua dest.
" glucose—cancer.	" " " Niagara water.
" " —tartaric acid—cancer.	Bean stems—glucose—tartaric acid.
" dog—cancer.	
" asparagin.	Beerwort.
" potash soap.	
" human glucose—neutral.	Potato infusion.
" tartaric acid—glucose (human).	Potato.
" fucus crispus.	



1

Plummer's yeast in lung of guinea pig. Hardened and stained according to Plummer's method. At α , an organism with single contour. (Oil immersion.)



2.

Field from same section as Fig 1. Yeast with thick capsule in act of budding. Central bodies. (Oil immersion.)

	Hay infusion.
Agar neutral.	" glucose water.
" + 15.	
" — 15.	Sugar water.
" potato.	Glucose water.
" glucose.	
" glucose—tartaric acid—cancer.	Fucus crispus water.
" beerwort.	" " hay infusion.
" serum.	
" hay.	Cabbage water.
" glucose—hay.	
" glycerin.	Lettuce water.
" fucus crispus.	
" cabbage water.	Bread.
Gelatin neutral.	Human fat.
" 15.	
" potash soap.	Casagrandi.
" beerwort.	
	Nährstoff (Hayden).
	" " soda.

In our experimental inoculations of animals we have usually been able to obtain the blastomyces by cultivation after the inoculation. The majority of lesions which we have produced have been those of typical blastomycetie mycosis with abscess formation, or characteristic granulomata containing the organism.

Having thus determined to our satisfaction that the yeast organism was not the essential cause of carcinoma and sarcoma and could not be confused with the organism we had already observed in fresh scrapings of carcinoma and in our experimental animals, and having already convinced ourselves of the identity of the organisms found in the fresh state and the forms known as Russell's bodies, Plimmer's bodies, and protozoan forms in the tissues, our attention was called to the possible relation between these inclusions in cancer and the vaccine bodies observed after inoculation of the cornea with vaccine virus, by an article by Dr. C. Gorini, in the *Centralblatt für Bacteriologie*, September, 1900, vol. xxviii., No. 8/9, entitled "Ueber die bei der mit Vaccine ausgeführten Hornhautimpfung vorkommenden Zelleinschlüsse und über deren Beziehungen zu Zellinklusionen der bösartigen Geschwülste." We had already noted the similarity of Russell's bodies to the illustrations of inoculated corneas, and it remained for us to harden and stain the cornea of rabbits which had been inoculated with vaccine virus after Plimmer's method. The result of our comparative test in this case shows not only that the half-grown form of the vaccine organism is very closely related in appearance to the bodies of Plimmer, but that the bodies of Russell in carcinoma and the protozoan forms in

carcinoma, all have their prototypes in the various stages of development of the vaccine organism. (See Plate XVI., Figs. 1 and 2.)

This striking confirmation of Gorini's observation was more than doubly confirmed when, after the recent announcement of Dr. M. Funk, in the *British Medical Journal* of February 23d of this year, on the cultivation of the vaccine organism, we repeated his experiment and found that the organism of vaccinia, while undergoing development, shows essentially the same phases we had already noted in the organisms observed in fresh scrapings of cancer and in the peritoneal fluid and blood of cancer cases.

Having thus convinced ourselves that the organism with which we were dealing was a protozoon belonging in the same group with the vaccine organism, it remains to be seen what evidence can be produced to show that these protozoa, which are a constant occurrence both in the fresh material of cancer and which we had cultivated and identified in the tissue under the form of Russell's bodies, Plimmer's bodies, etc., are the cause of cancer.

We have found it necessary to carefully restrain the tissues of all our earlier animals with Plimmer's method, and, as this work is not yet complete, we deem it advisable to withhold the complete series until we are in a position to consider certain phases of the question which will require an investigation of tissues from other diseases, which are possibly protozoan infections.

That the protozoon of cancer is capable of producing even in man lesions of a very different nature from infection of the epithelium, seems to be strongly indicated by the following observation:

Case 108. Mrs. E., aged forty-five years. Well-developed cancer of right breast, with axillary lymph nodes, operated upon February 5, 1901, at Buffalo General Hospital by Dr. Park. The case in question attracted our attention because of a pigmented pustule beneath the skin of the right axilla. The clinical notes in brief are as follows:

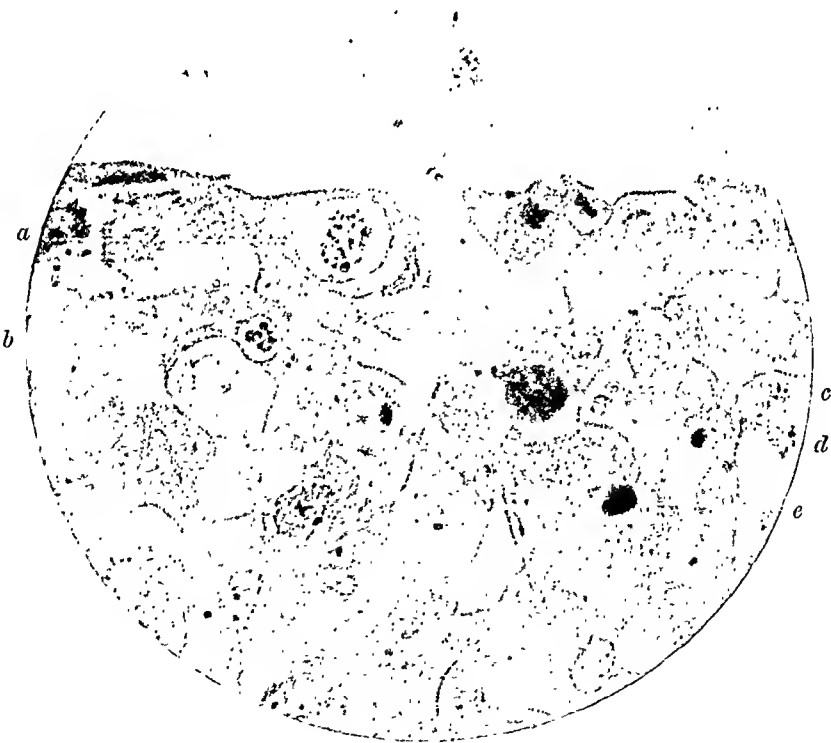
Three years ago observed a retraction of the nipple. Six weeks ago noted a well-defined tumor in the right breast. At the same time a small nodule was felt beneath the surface of the skin of the right axilla. This developed in a region which was subject to irritation by the edge of the patient's corset.

In removing the tumor Dr. Park carried a flap up into the axilla, removing the axillary lymph nodes and including the pustule above mentioned. The tumor reached the laboratory one hour and a half after the operation. An inspection of the tissues removed shows them to consist of an enlarged right breast with a thickened and retracted nipple. The flap of skin removed is included between two curved incisions. At a distance of about five inches from the nipple there is an elevation of the skin somewhat larger than a pea. The skin cover-



1.

Recent vaccination of cornea (third day). At *a*, young vaccine organism (analogous to Russell body) entering epithelial cell of cornea. (Oil immersion.) (Plimmer's method.)



2.

Section of vaccinated cornea (seventh day). (Plimmer's method.) At *a* and *b*, bodies analogous to Plimmer's bodies; *c* and *e*, younger forms of parasite. At *d*, a small organism within the nucleus of an epithelial cell.

20

ing it is glazed, and on palpation it is found to contain fluid. On opening this pustule a small amount of dirty red fluid escapes. Examined in the fresh state with the microscope this material is found to consist of leucocytes, red blood-corpuscles, and a large number of cells, from five to ten times the diameter of a red globule, possessing coarse and fine granulation. Some of them contain highly refractive bodies somewhat finer than ordinary cocci, but the greater number have embedded in their protoplasm poorly defined, hyaline, pale-green, spherical bodies, somewhat smaller than red blood-corpuscles. When treated with acetic acid these hyaline bodies and the granules of the cells become more distinct, and nuclei may be made out. Beside these cells are a large number of ordinary pus cells, which form the principal constituent of the fluid.

On cutting into the breast it is found to consist for the most part of fat, through which runs sharply-defined bands of carcinomatous tissue. At no point in the structure is a well-defined tumor mass. From the most vascular portion of the carcinoma fresh scrapings were made. Under the microscope these scrapings are found to consist of closely packed epithelial cells with vesicular nuclei. A large amount of free fat is found in the preparation, but the cells show very slight evidence of fatty degeneration. Between the fat droplets are a considerable number of small, greenish hyaline bodies, which, in our experience, can be recognized from fat by the slight difference in refractive index and color.

Portions of the tumor were hardened in Hermann's fluid. On examining the axillary fat a group of five or six enlarged lymph nodes may be detected. On dissecting these out and incising them they are found to contain more or less extensive deposits of cancer. Sections of these were hardened in sublimate and Hermann's fluid.

Fresh examination of scrapings from these lymph nodes reveals the presence of bodies which correspond to what we have recognized as the fresh Plimmer body. They are composed of pale fluid protoplasm, and contain a group of fine granules. Their outlines are well defined, and in many cases they appear to be sending out projections. In some of these bodies the protoplasmatic granules show active Brownian movement. An examination of the sections from the tumor and lymph nodes shows the case to be one of soft carcinoma of the breast with metastases in the axillary lymph nodes. Stained with Plimmer's method a considerable number of the various forms already mentioned can be found—Russell's bodies, Plimmer's bodies, and protozoan forms. A section through the pustule hardened and stained with Plimmer's method reveals a most interesting condition. It consists of an abscess in the subcutis. Upon the surface the papillæ of the cutis are normal, but directly above the abscess three or four of the papillæ are seen to be hypertrophied

and extend into the subcutaneous tissue. The abscess appears to be made up for the greater part of masses of spherical bodies somewhat smaller than leucocytes. There is no apparent inflammatory reaction about the periphery. The bloodvessels show no engorgement. (See Plate XVII.) Under high dry power the abscess is found to be composed of leucocytes with horseshoe nuclei and a large number of spherical and oval, deeply-stained bodies, which closely resemble large Russell's bodies. (See Plate XVIII.) Beside the leucocytes and these small spherical bodies are a large number of large, oval, and spherical cells with one or two nuclei. Many of these contain deeply-stained spherical bodies, somewhat smaller than the free spherical bodies in the tissue. Others of nearly the same size contain a large number of small hyaline bodies which do not take the stain. These, we are inclined to believe, are the sacs of the parasite. (See Plate XVIII.)

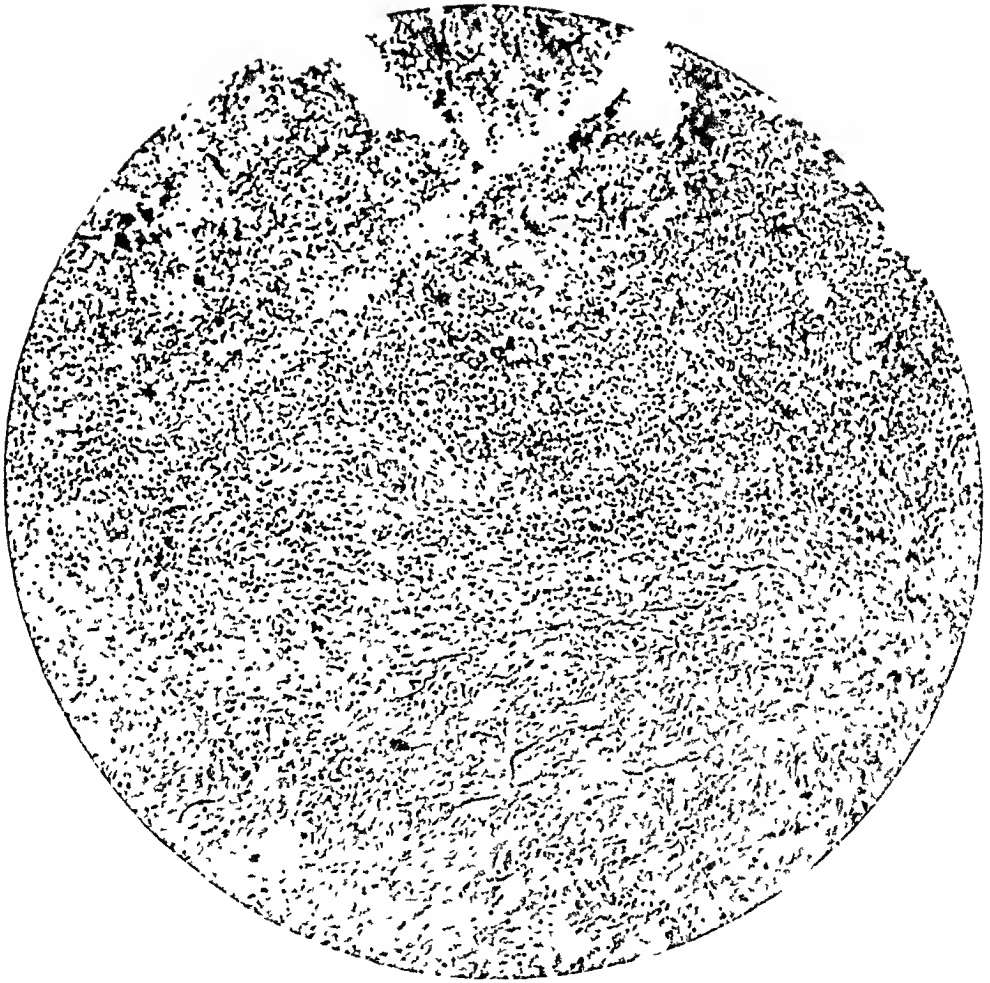
Beside the small forms and large sacs we have found a number of spherical bodies about four times the diameter of the leucocyte, which stain brilliantly with the Bordeaux red of the preparation. In a number of these bodies we have found evidences which are strongly suggestive of segmentation, after the manner recognized in malarial parasites. The bloodvessels within the focus contain, beside red blood-cells, large numbers of the deeply stained oval and spherical Russell's bodies. In some cases the endothelium of the capillaries is greatly swollen and contains one or more of these deeply stained bodies.

We are inclined to believe from this observation that this pustule is the result of embolic deposit of the parasites from the cancer of the breast, and we would interpret it, pending further observation, especially in the light of our animal experiments, as indicating that the organism of cancer is capable of producing other lesions than that of epithelial infection.

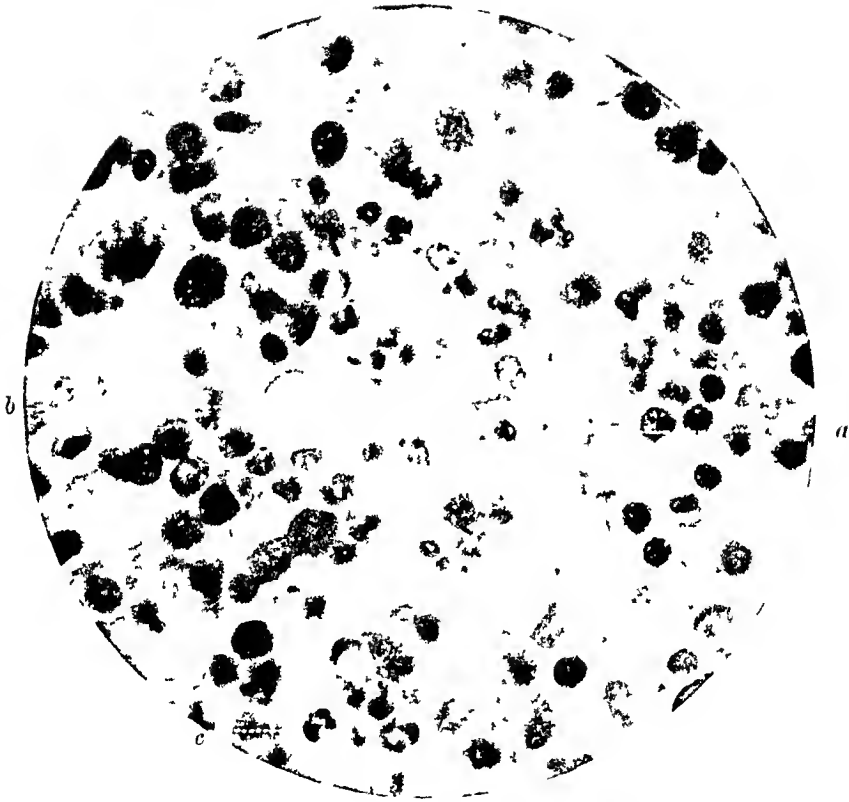
The material with which our animals were inoculated consisted of peritoneal fluid from cases of abdominal carcinosis, fluid from the interior of malignant ovarian cysts, sterile cancer, and dried sterile cancer and lymph nodes rubbed up with salt solution. Some of these latter contained metastatic deposits of cancer, but a number were simply the enlarged lymph nodes, in which we had already detected Russell's bodies. In each case the fresh material was carefully examined before and the presence of parasites was determined. The presence of parasites was likewise verified in hardened sections of the material where this was possible.

The following is summarized from the complete list of animals, which will appear in the second part of this communication:

PLATE XVII.



Embolie skin pustule from carcinoma of breast. Deeply stained spherical bodies are protozoa. (Low Power.)



Field from center of skin pustule, shown on Plate XVII. At the center remains of spore cysts. One at *a* contains a single deeply stained body (young parasite). At *b*, a half-grown organism stained red. *c*, a leucocyte. Remainder of field filled with young spherical and oval organisms and polymorph nuclear leucocytes. (Plimmer's method) (Oil immersion)

ANIMALS INOCULATED WITH MATERIAL AND CULTURES FROM CARCINOMA AND SARCOMA IN MAN.

- 2 guinea-pigs inoculated in the jugular with peritoneal fluid, died in 22 and 19 days respectively.
- 14 " inoculated in the peritoneum with peritoneal fluid, died in an average of 58 days.
- 1 guinea-pig inoculated in the right eye with peritoneal fluid, died in 10 days.
- 1 " inoculated in the jugular with filtered serum, died in 304 days.
- 1 " inoculated in the jugular with cancer mush, died in 15 days.
- 4 guinea-pigs inoculated in the peritoneum with cancer mush, died in an average of 57 days.
- 11 " inoculated in the peritoneum with dried lymph nodes, died in an average of $45\frac{4}{11}$ days.
- 7 " inoculated in the peritoneum with sarcoma, died in an average of $92\frac{2}{7}$ days.
- 2 rabbits inoculated in the ear vein with peritoneal fluid, died in 93 and 17 days respectively.
- 1 rabbit inoculated in the ear vein with filtered serum, died in 164 days.
- 1 " inoculated in the peritoneum with cancer mush, died in 292 days.
- 1 " inoculated in the peritoneum with sarcoma, died in 278 days.
- 1 " inoculated in the mediastinum with sarcoma, died in 41 days.
- 1 dog inoculated in the peritoneum with peritoneal fluid, died in 64 days.
- 1 " inoculated in the peritoneum with sarcoma, died in 160 days.

ANIMALS INOCULATED FROM ANIMALS INFECTED WITH PARASITES FROM CARCINOMA AND SARCOMA IN MAN.

- Pig 23, inoculated in abdominal wall with lymph gland and peritoneal fluid from Pig 16, died in 9 days. Case L., adenocarcinoma of the omentum.
- " 55, inoculated in abdominal wall with several nodes from Pig 52, also portion of old original tumor, died in 4 days. Case LVII., squamous epithelioma of skin.
- " 72, inoculated in abdominal wall with B-pig 67-a, 2 c.c. node emulsion in water, died in 37 days. Case L., enlarged axillary lymph nodes recurring sarcoma breast.
- " 75, inoculated in abdominal wall with $2\frac{1}{2}$ syringes B-pig 66-a, nodes powdered in sterile water, died in 59 days. Case L., enlarged axillary lymph nodes recurring sarcoma breast.
- " 73, inoculated in abdominal wall with 2 c.c. nodes in water B-pig 64-a, died in 48 days. Case L., enlarged axillary lymph nodes, recurring sarcoma breast.
- " 76, inoculated in abdominal wall with A-pig 68-a, nodes powdered in water, died in 17 days. Case LXI., carcinomatous lymph nodes from axilla accompanying well-developed carcinoma of breast.
- " 15, inoculated in the abdominal wall with 2 c.c. fluid from peritoneum Pig 13, died in 8 days. Case XXIII., recurrent sarcoma thigh.

The points of interest are that 14 guinea-pigs, inoculated in the peritoneum with peritoneal fluid containing the organism, gave an average

length of life of fifty-eight days; 4, inoculated in the peritoneum with cancer mush, gave an average length of life of fifty-seven days; 11, inoculated in the peritoneum with dried cancerous lymph nodes, gave an average length of life of forty-five and four-elevenths days; 6 guinea-pigs, inoculated with peritoneal fluid and lymph nodes from animals which were infected in the above manner, gave an average length of life of twenty-nine days—a little more than half the length of time for the animals inoculated directly from man.

This unquestionably shows the increased virulence of the organisms after passing through one animal. We are continuing these experiments in modified form and shall report upon them later.

The average length of life for rabbits inoculated in various regions with the different forms of material used shows the greater resistance of this animal to infection. In our most recent experiment we have succeeded, by growing the organism in a collodion sac (suggested by Dr. Clowes) in the peritoneal cavity of a rabbit, in so increasing the virulence of the organism that a healthy rabbit inoculated in the ear-vein died of general hæmatogenous infection from the organism after a period of fifteen days. (Rabbit 56 of the list.)

It will be shown from these experiments that animals are readily infected when inoculated with carcinomatous material as well as pure cultures of the organism. The peritoneal fluid used in all of these inoculations was bacteriologically sterile, and consisted essentially of a pure culture of the organism. Two animals—one guinea-pig and one rabbit—which were inoculated with filtered serum from which the organism had been removed, gave a respective length of life of 304 days and 164 days. The organs of these animals were free from parasites.

The macroscopical pathological findings in these cases were generally uniform. All the animals were greatly emaciated and presented, on opening the abdominal cavity, collapsed intestines, reddened peritoneum, enlarged peritoneal lymph nodes, and a moderate amount of clear, straw-colored fluid. The lungs were dark red in color, collapsed; heart contained but small amount of blood; the spleen was enlarged and reddened; the liver in many cases was hyperæmic, and the kidneys were generally injected.

One dog (Dog 18) presented a large lymphoma of the spleen. This case will be considered separately. Dog 8, inoculated from sarcoma. Case XXIII., shows typical metastases of sarcoma in all of the regional lymph nodes.

In almost all cases a fresh examination was made of the peritoneal fluid, the organs, and the blood, and, wherever made, large numbers of the parasites could be readily detected, as already described.

Two guinea-pigs and two rabbits, inoculated in the jugular with peri-

toneal fluid, show macroscopical lesions in the lungs very closely resembling those reported in our *Pig 1*—that is, minute white dots scattered through the pulmonary structure, usually localized in the neighborhood of the bronchi. Sections from these lungs, stained with hamatoxylin, show the presence of multiple beginning adenocarcinoma of the bronchi.

These we should interpret as beginning adenocarcinoma of the lung in 4 animals, making, with our Case I., 5 animals in which the injection has been followed by infection of the bronchial epithelium. One guinea-pig presents a condition of the lungs and liver which we wish to interpret as *primary carcinoma of those organs*, and 1 dog presents a lymphoma of the spleen, the size of a large hazel-nut, which we also attribute to the inoculation of the animal with dried lymph nodes from a case of carcinoma. The tumor cells in all of these animals contain the characteristic forms of the parasite.

1. THORACIC ANEURISM. 2. CARCINOMA OF SUPERIOR MAX-
ILLA. 3. CHOLELITHIASIS AND SUPPURATIVE CHOLE-
CYSTITIS. 4. INGUINAL HERNIA OF (a) BLADDER;
(b) CÆCUM.¹

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1. *Thoracic Aneurism.* This case was an aneurism of the thoracic portion of the left common carotid artery. The patient was a male, aged thirty-nine years, and came under observation in November, 1899. His general condition as regards strength, health, etc., was perfect. Previous history as regards disease of all kinds was absolutely negative.

At the age of twenty-three years, sixteen years before admission to Bellevue Hospital, he had received a pistol-shot wound in the left side of the neck, which healed without complication. Nothing developed until the fall of 1897, when a swelling was noticed under the scar, well down in the neck. From that time the swelling increased in size, slowly but steadily, and with increasing severity of pressure-symptoms, pain, dyspnoea, and coughing, which interfered with sleep and were beginning to undermine the patient's health. Medical treatment had been tried for six months, but without relief.

Examination: On inspection a swelling, about the size of a lady apple, was observed in the left side of the neck close to the sterno-

¹ Read before the New York Surgical Society, February 27, 1901.

clavicular articulation. Palpation showed the existence of the regular symptoms of a sacculated aneurism and also that the aneurism was slightly overlapped by the sternomastoid muscle. On gentle manipulation the overlying tissues appeared loose, while active motions of the neck in all directions were normal. Auscultation confirmed the diagnosis of aneurism and also showed a downward extension into the thorax. Pulsation in the left radial artery was synchronous with that of the heart, this probably excluding the left subclavian artery as the point of origin. There were no signs of communication with the internal jugular veins nor were any bony parts involved.

The question of treatment was now to be considered. The patient was in good condition; his arteries, heart, lungs, and kidneys were normal. As medical treatment had been unavailing, there was the choice between an operation and doing nothing, since such measures as needling and introducing wire did not seem to be indicated. Furthermore, the patient was steadily growing worse and was desirous, as were his friends, of having an operation performed, fully appreciating its possible fatal outcome. If it had been merely a question of ligation based on a definite size of the tumor there might have been less doubt as to what to do; but the somewhat indefinite limits of the aneurism certainly suggested possibilities of failure if ligation were attempted with an ordinary incision, even if the latter were deepened by removal of pieces of the sternum and clavicle. It was, therefore, decided to operate and to make an unusually large exposure of the aneurism, with the idea not only of having plenty of room for ligation, but also of possible extirpation of the sac.

The operation was performed ten days after admission and was as follows:

The incision followed the anterior border of the sternomastoid muscle, extending from its mid-point to the middle line of the sternum, crossing the sternoclavicular joint. From this point a second incision was carried outward, parallel to and just below the clavicle, well beyond the middle of the bone. The soft parts were then retracted at the apex of this triangle and at the outer end of the clavicular incision sufficiently to use a wire-saw, by which were divided first the clavicle at the point indicated, and then the sternum and cartilage of the first rib, the latter being cut through close to the former. The flap was then dissected upward and outward, the dissection being carried under the sternomastoid, which thus formed part of the flap, the bony portions being the inner half of the clavicle, the sternoclavicular joint, and the adjoining portion of the sternum.

The raising of this flap was extraordinarily difficult on account both of dense adhesions and hemorrhage, almost every cut with knife or scissors and even blunt separation of the tissues being followed by profuse venous oozing and spurring.

After the flap was raised the aneurism was found to extend mesially over the common carotid and downward under the first rib. It was also bilobed, a bit of fascia constricting it, so that the smaller part lay over the scalenus anticus muscle. The stiffness of the sac and the presence of the first rib prevented the finger from getting in under it from any direction. The rib and cartilage were then resected as far out as the subclavian vein, the constricting band removed, and adhesions separated

below. These procedures allowed a more extended palpation, which showed that the sac reached downward over the left innominate vein and that it arose neither from the aortic arch nor from the subclavian artery.

It was then determined to ligate the left common carotid, but the patient's condition forbade anything more. In clearing the sac several profuse venous hemorrhages had occurred. These, together with the previous hemorrhages and the length of time elapsed—now more than four hours—necessitated infusion and stopping the operation. The wound was packed with sterile gauze, several clamps left *in situ*, the flap brought down, and a large dressing applied.

The next morning the patient was in good condition and desired a continuation of the operation when told that it was not yet complete.

Five days later he was again etherized and the wound opened. The thin layer of granulation tissue, which had spread itself more or less completely over the parts, was wiped away and the clamps left at the first operation removed. The lower end of the left carotid was then exposed and ligated about a quarter of an inch above its origin, which was followed by immediate cessation of pulsation within the sac. This procedure, however, was one of no small difficulty, owing to adhesions and hemorrhage, and required nearly an hour's time.

Had the operation been terminated then the patient would certainly have survived and possibly made a more or less permanent recovery, provided the conditions of the wound permitted. These were somewhat difficult to deal with. The sac was now enormously enlarged and projected not only in the neck but also between the outer edges of the sternum and first rib, thus absolutely precluding any replacement of the flap as originally formed. To replace the flap would have necessitated removal of the bony portions and stretching the soft parts over the aneurism.

Primary union would have been impossible and healing could take place only by means of a long granulation process, attended by probable sepsis, to say nothing of secondary hemorrhage.

Extirpation of the sac was accordingly decided upon, and, as a preliminary step, the upper part of the artery was exposed and ligated. An attempt was then made to raise the aneurism from its bed by retracting it mesially and dissecting in under it along its outer border. After about half an hour, however, the amount of adhesions and venous hemorrhage encountered showed that removal in that way was impossible. Since the artery was tied in two places it was decided to split the sac and remove it piecemeal.

Time for infusion having been allowed, the sac was cut into and split, the upper and lower portions of the internal jugular vein having been previously sufficiently cleared of adhesions to permit clamping should it be necessary on account of a possible communication with the vein. The vein should have been ligated, but the patient's condition demanded the loss of no time.

On splitting the sac it was found to contain a quantity of laminated fibrin loosely arranged concentrically around the wall, which was thin.

During the removal of some of this fibrin a sudden violent venous hemorrhage from within the sac took place, which was stopped at once by clamping the jugular at the places prepared. The sac was then

partly cleared of blood and clot in an endeavor to find an opening into the vein.

All further investigations, however, were then brought to an end by the quiet death of the patient.

A post-mortem examination, not obtainable later, might, it is true, have been made at once, even if a trifle irregular; but, to speak frankly, disappointment at the fatal result was sufficiently keen to cause entire loss of interest.

This case is reported simply because of its general interest as touching on the question of extirpation of aneurisms. I fear that there can be but little learned from it. There was nothing in the physical signs at the examination indicative of the difficulties to be encountered. Therefore, until these thoracic aneurisms can be more accurately mapped out it would seem best either always to be prepared for adhesions and hemorrhage—which, of course, may not be found—if an operation is undertaken or not to operate at all. In this particular case no operation should have been performed, but this was certainly not positively evident, in the author's judgment, before the operation.

2. *Carcinoma of Superior Maxilla.* Male, aged forty years, came under observation early in January of this year.

The growth occupied the roof of the mouth and involved the gums and alveolar processes of both maxillæ, extending from the first molar tooth of the right side to the canine tooth of the left. It also involved the anterior half of the hard palate of the right side. The mass was soft, friable, nearly filled the month, and was constantly bleeding, with an offensive discharge. General health was greatly depreciated, with marked cachexia. The tumor had grown rapidly, beginning as a small lump behind one of the front teeth only eight weeks previously. The nasal fossæ were normal. No glandular enlargements.

It was evident that if removal were to be attempted three things were desirable, viz., to minimize hemorrhage, to exclude blood and discharge from the air passages, and rapidity of removal, which last would be greatly facilitated by adoption of the first two.

Accordingly, on January 16th, the external carotid artery was ligated on both sides, a tracheotomy tube inserted through the cricothyroid membrane, and the pharynx packed with a large sponge with string attached.

The upper lip was then split in the middle line and the growth extirpated by use of rongeur forceps. Venous oozing was considerable, but ceased as soon as the limits of the tumor were reached. No other form of hemorrhage occurred.

The portions of bone removed included the alveolar process of the right side as far back as the second molar tooth, the alveolar process of the left side as far as the first bicuspid tooth, and the contiguous portions of the hard palate of both sides as far back as the posterior third, thus leaving a bony bridge in that situation. Healthy bone was removed on all sides of the tumor, as indicated by its firm resistance to the biting of the forceps. The nasal fossæ were normal as well

as the antrum of the right side, which was necessarily opened from below.

The cavity was then packed and the lip sutured. The entire operation lasted about an hour and a half. The pharyngeal sponge was removed after a few hours. Recovery was uneventful. The tracheotomy tube was removed on the second day, the wound healing inside of a week. The incisions over the arteries closed by primary union.

The pathologist's report was that the tumor was a carcinoma, originating probably from the mucous membrane covering the gum; hence, strictly speaking, a *squamous-celled epithelioma*.

The patient's present condition is one of great comparative comfort. He eats and sleeps well and has gained considerable weight. There is very little falling in of the face, which can later be easily corrected by a plate. Cicatrization is not yet complete. There is at present no evidence of a recurrence, which, however, will probably take place, and this the patient understands.

My reasons for reporting this case are two: First, the rather unusual character of the growth, sarcoma being the common form of malignant epulis or tumor starting on the gum; and the second is to call attention to the great advantages secured in these operations by preliminary tracheotomy, packing the pharynx, and ligating the carotids—proceedures which many operators regard at least as superfluous and unnecessary, but which, in this case at all events, would have been indispensable.

3. The case of *cholelithiasis* and *suppurative cholecystitis* was remarkable in that the patient, a woman, aged thirty-five years, gave no symptoms indicative of these conditions for a period of eight or ten weeks, during which time, however, she had marked jaundice and evening rise of temperature to between 101° and 102° F., clay-colored stools, etc. No local pain, nor tenderness, nor hyperleucocytosis were present.

She was finally transferred, October 22, 1900, to the surgical side (Bellevue Hospital) for an exploratory incision. This was performed, and a moderately distended gall-bladder was found and opened and nearly an ounce and a half of pus evacuated. Two stones were then extracted, and a third was found impacted in the neck of the bladder and extending to the junction of the cystic and hepatic ducts, the former, of course, being greatly distended. The stone was removed after some manipulation. The stones were about three-eighths of an inch in diameter. More pus followed the removal of the last stone, showing a state of suppuration of the bile-ducts. Cholecystostomy was performed and recovery was uneventful. Bacteriological examination of the pus showed the ordinary mixed pyogenic infection.

4. *Right Inguinal Hernia of the (a) Bladder*. This subject has attracted considerable attention during the past few years and the present case is reported on that account.

The patient, referred to me by Dr. McSweeney, of this city, was a male, aged fifty-seven years, and very stout. The tumor appeared four years before admission to the hospital, in September last, rather suddenly and from no apparent cause. It increased in size slowly but steadily. Complete reduction was impossible during the last three years, but increase in size just before and decrease in size just after micturition were noticed. These symptoms, of course, indicated the probable diagnosis, which was confirmed at the operation, which the patient came in for owing to increasing pain and discomfort.

The hernia was a large one and extended into the serotum. When the sac was opened careful examination of the protruded portion showed it to be fully one-half of the bladder. Reduction was greatly facilitated by withdrawal of about six ounces of urine through a catheter introduced through the penis. Nothing abnormal was found as to the sac, the tunica vaginalis being intact. Closure of the wound; uneventful recovery.

The hernia of the (b) cæcum deserves a passing mention, owing to its rarity, and especially this case, as it was on the left side. The diagnosis was not made until the sac was opened, the symptoms having been those of a regular reducible inguinal hernia of good size, but with commencing pain, discomfort, and constipation. As the patient was not in first-class condition, no exploration was made to determine the exact condition of the mesocolon, etc., the part being at once returned and the wound closed. Recovery uneventful.

This must have been simply a congenitally too long ascending mesocolon, or a condition of *incomplete revolution* of the large intestine resulting in a mesially placed cæcum and ascending colon, the mesentery and small intestines lying over to the right of the vertebral column. Transposition of viscera was excluded by a careful examination after the operation.

Finally, in connection with these hernia cases, I should like to mention a method of operating which I have used during the past four or five years and with great satisfaction. Without claiming any especial originality for it, I have not seen it described anywhere. It is simply this:

A Bassini operation is done in all respects except that the aponeurosis of the external oblique is sutured *under* the cord instead of over it, this feature being the same as in Halsted's operation, and in my opinion lending additional strength to the abdominal wall, which is thus made solid, so to speak, under the cord.

THE CARBOHYDRATES OF THE URINE IN DIABETES INSIPIDUS.

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RECENTLY Rosin and v. Alfthan reported their results from the estimation of the unfermentable carbohydrates of the urine in diabetes mellitus. They make the interesting statement that beside the well-known excretion of glucose in pathological quantities there is in this disease a marked increase in the unfermentable carbohydrates. The daily amount of the total urinary carbohydrates under normal circumstances was never, in their experience, notably more than 5 grammes, and averaged roughly about 1.6 grammes. Similar amounts have been found with normal subjects by several other workers. On the other hand, the smallest daily amount of unfermentable carbohydrate alone in fermented diabetic urine was found by Rosin and v. Alfthan to be about 9 grammes, and in some instances they demonstrated as much as 20 grammes. They conclude from these results that diabetes mellitus can no longer be looked upon as a pure "glucose disease," but is rather a disturbance of carbohydrate metabolism in general.

The method used was precipitation of the carbohydrates by benzoyl chloride in the presence of sodium hydrate. The carbohydrates come down after prolonged shaking of the mixture as benzo-esters, and when the method is properly carried out the precipitate can be fairly readily collected on a filter, washed, dried over sulphuric acid, and weighed. Since the method was described by Baumann it has been investigated by Wedenski, v. Fodor, Roos, Lehmann, Salkowski, Baiseh, and Lemaire, and it has been shown that the results obtained indicate with a very fair degree of accuracy the amount of carbohydrate in the urine, when this is small, as is the case under normal circumstances. The precipitate seems to be composed very largely of the esters formed from the carbohydrates, and although there is a slight admixture of nitrogenous matter and salts, and perhaps the esters are in small part not the product of carbohydrates, the error is not sufficient to interfere with the use of the method as an index of variations in the carbohydrate excretion.

Several points in the papers by Rosin and v. Alfthan arrest one's attention. In the first place, they note that it is of interest to learn whether the unfermentable carbohydrates are still excreted in large amounts in diabetes mellitus when the glucose excretion has disappeared

under the influence of diet. This might prove to be a point of serious importance in prognosis. Further, v. Alftthan states that in one case of diabetes insipidus which he had under observation, but which at the time of his report had not been completely investigated, the carbohydrates seemed to be increased. If an increase could be shown in a considerable percentage of cases of diabetes insipidus it might indicate an interesting relation between this affection and diabetes mellitus. These suggestions led me to make a series of estimations of the esters formed by this method in the urine of a patient in Dr. Stengel's wards at the University Hospital.

The man, who was an intelligent clerk, aged twenty-seven years, was admitted January 7, 1901, with a history of rather sudden onset, in June, 1900, of polyuria and excessive thirst. This had persisted and had been accompanied by decided loss of weight—about thirty pounds. He stated that his physician had examined his urine repeatedly and had told him that he had diabetes, but he had had no notable increase of appetite and no other symptoms that would strongly indicate the existence of diabetes mellitus, and the urine when he came to the hospital contained no sugar and no acetone, or diacetic acid; albumin and casts were likewise absent. The daily amount of urine was, however, above 4000 c.c., and he had excessive thirst. At the time of admission it was readily discovered that the man was in the early stages of typhoid fever, and he went through a typical mild course of this disease. It seemed possible from the history that he gave that he actually had diabetes mellitus and that the glycosuria had disappeared under the influence of the typhoidal infection. It was with the thought in mind that under such circumstances the benzoyl chloride method might prove to have actual diagnostic value that the estimation of the esters was first undertaken, for a persistent excess in their amount may perhaps be present under such conditions, and if present would probably be a valuable indication of the actual existence of diabetes mellitus in the temporary absence of glycosuria. This point is certainly worthy of investigation, as is the amount of esters found by this method in the urine of those persons who are constantly ready subjects of alimentary glycosuria, those who have hereditary predisposition to diabetes mellitus or other metabolic disturbance, or those who for any other reason are suspected of being ready subjects of diabetes mellitus. The further course of the case under discussion has demonstrated that it is not diabetes mellitus, but, as seemed highly probable from the beginning, diabetes insipidus. Sugar has always been absent from the urine, and the man has had no symptoms excepting undue thirst and polyuria, barring those of typhoid fever. The daily urine now averages about 4500 c.c.

The results obtained in estimating the esters may then be considered solely in their relation with diabetes insipidus. I was unable for a number of reasons to carry out the work until the man had practically begun his convalescence from typhoid fever; the diuresis had been a little reduced by this time through limitation of his fluids so far as was compatible with comfort.

The conclusion that may at once be drawn from the figures in the following table is that the carbohydrates were not increased; the figures obtained by control estimations of the esters and by coincident nitrogen estimations for a part of the time (Kjeldahl method) are given for reasons which will be noted later:

Date.	Amount of urine in c.cm.	Esters in gms.	Nitrogen in gms.
February 7	3670	2.752	. . . .
" 8	3820	{ 6.494 6.229	. . . .
" 11	3280	{ 2.427 2.099	. . . .
" 12	3370	{ 2.830 2.897	. . . .
" 13	3450	{ 2.484 2.691	14.076
" 14	4050	{ 2.277 2.754	13.923
" 15	4100	{ 1.517 1.413	12.628
" 16	2120	{ 1.611 1.484	8.814
" 18	3400	{ 1.666 1.768	15.803
" 19	1800	{ 1.512 1.368	11.551
" 20	1840	{ 1.325 1.288	9.991

The figures of February 8th are, to be sure, somewhat abnormally high, but they are so wholly at variance with all the other results in this case that I am inclined to think that there was an error in technique. The close correspondence of the control results speaks against this (the two estimations were carried out separately from the beginning), but even though the figures be correct the result is such an isolated one that it deserves no special comment, and all the other figures are wholly within the normal range. So far, then, as this case goes the results speak against the probability of any marked increase in the urinary carbohydrates in diabetes insipidus. One would certainly be inclined to anticipate this from the beginning, as no other similar relation between this disease and diabetes mellitus has been demonstrated. I should not be surprised, however, were a rather high excretion of urinary carbohydrates shown to be present in many cases of diabetes insipidus as a result of the excessive diuresis alone, not as an indication of disturbed carbohydrate metabolism. An increase of the urinary carbohydrates in this disease, unless very marked, could scarcely be looked upon as evidence of any primary disturbance of the metabolism of carbohydrates, for it is well known that flushing the system

with large quantities of water will cause a marked increase of the nitrogen output, and I have shown that this persists over a considerable period, and perhaps constantly so long as the excessive amounts of water are taken; a positive nitrogen balance may even be converted into a nitrogen loss in this way. Similar results were obtained by Ter Gregorianz and Karehagin in normal subjects in nitrogen equilibrium, and by Matzkevich and Grusdiev in subjects of typhoid fever who showed a negative nitrogen balance. It is wholly probable, then, that the constant flushing in diabetes insipidus may carry off an abnormally large amount of carbohydrates in the urine, and that a portion of the increase in diabetes mellitus which was observed by Rosin and v. Alfthan may be due to the same cause, though this alone could not produce the very marked change seen in the latter affection. Another fact which would lead one to expect an increase with the free diuresis of diabetes insipidus is that actual glycosuria may be produced by some diuretics which act directly upon the kidney. That increase or decrease in the diuresis does cause an increase or reduction in the urinary carbohydrates is, I think, shown fairly definitely in the table given above. From February 15th to February 20th, inclusive, the man's fluids were reduced to as low a point as was possible without causing serious distress. The excretion of urine remained high on the 15th, though he certainly got only about 3000 c.c. of fluid in both food and drink during that day. On the 16th, 17th, 19th, and 20th the excretion was far lower than at any other period of observation. (The amount of urine on the 17th was 1780 c.c., but the esters were not estimated.) The average figures for the esters up to February 14th (excluding the result on February 8th, which is very probably incorrect) is 2.598 grammes; for the period from February 15th to February 20th, inclusive, 1.499 grammes. Hence the restriction of fluids reduced the esters to 58 per cent. of their previous amount. If the two periods be made according to the drop in the excretion of urine it is interesting to note that the average of esters for the period from February 7th to February 15th, inclusive, is 2.410 grammes, while for that from February 16th to February 20th, inclusive, is 1.502 grammes, while the average amount of urine in the same periods is 3650 c.c. and 2290 c.c. respectively. The average amount of esters in the second period is, then, 62 per cent. of the average in the first period, while the average amount of urine in the second period is 63 per cent. of that in the first period. This correspondence between the diuresis and the amount of esters, while its exactness is probably largely accidental, is too close to allow one to overlook the fact that the two bear a decided relation to each other. Diet could have played no part in this, as absolutely the only change made in the man's regimen was in the amount of water given him. Throughout the whole series of estimations he was given

exactly the same food in constant quantities; the food consisted of milk, eggs, butter, bread, and sugar. The amount of carbohydrates in the urine is, therefore, evidently influenced to a very decided degree by the amount of urine passed and very probably, as suggested by Rosin and v. Alfthan, by the diet also. It is quite possible that excessive diuresis is sufficient to explain the result obtained by v. Alfthan in his case of diabetes insipidus, and it would certainly be necessary to demonstrate a very marked increase in order to show by this method even a probable relation between diabetes mellitus and diabetes insipidus so far as carbohydrate metabolism is concerned. If further investigation should show a moderate increase of esters in diabetes insipidus I should be very strongly inclined to attribute this increase wholly to the abnormal diuresis. The man whose case I report did not show any increase at the time of the investigation, but it would not surprise me if another series of estimations undertaken in the same case after six months or a year had passed demonstrated larger quantities of carbohydrates than those reported here, for the man was, as stated, convalescing from typhoid fever when these estimations were made. A marked tendency toward the laying on of tissue after severe acute diseases is demonstrated both by clinical observation and by exact determinations of the intake and outgo in such subjects. This man was increasing in weight and was evidently retaining nitrogen, as his food contained about 15 grammes of nitrogen while his excretion in the urine was notably more than 14 grammes in only one instance. It seems to me that he was very probably excreting less carbohydrates also than would be the case under ordinary circumstances. At any rate, this possibility is of sufficient interest to deserve investigation in other instances.

The nitrogen was estimated for a number of days coincidently with the esters for two reasons: To see whether there was the same relation between the amount of fluids taken and the nitrogen excretion that I have previously referred to; and to see whether there was any relation between the nitrogen excretion and the excretion of carbohydrates. The latter point was chiefly of interest because v. Alfthan stated that he thought that the unfermentable carbohydrates may be looked upon as derived from body protein or from glycogen—*i. e.*, that they are produced in the body. If they are derived from body protein their excretion should show some relation to the nitrogen excretion if the nitrogen intake is kept constant, as was practically the case with this man. In regard to the latter point the ratio of esters to urinary nitrogen was as follows: February 13th, 1 to 5.44; February 14th, 1 to 5.53; February 15th, 1 to 8.5; February 16th, 1 to 5.69; February 18th, 1 to 9.2; February 19th, 1 to 8.02; February 20th, 1 to 7.65. There was a general tendency for the nitrogen and the esters to rise and fall together, as most of the urinary solids tend to do in a

general way. There was not the slightest tendency, however, toward the maintenance of any fixed ratio in the excretion of the two, and so far as such an observation goes it points against the formation of the urinary carbohydrates in this case from body protein. So complex a question cannot be settled in this off-hand manner, however, and this point in the figures is not worthy of much insistence. The question of the origin of the carbohydrates will be touched upon again at the end of this paper. The nitrogen excretion shows, in general average, the same rise and fall with increase or decrease of intake of fluids that I have previously described, and I think that it is quite thoroughly established by the observations to which I have referred and by my own earlier results that excessive water ingestion increases protein metabolism—a fact which is, as I have previously insisted, of much importance in explaining the clinical results of immoderate use of fluids.

There are one or two points concerning the benzoyl-chloride method that may be worthy of mention. In the first place, it is absolutely essential to have a good preparation of benzoyl chloride—a fact which is not sufficiently insisted upon by those who have previously discussed the method. Some of the difficulties in the use of the method described by several authors were not improbably due to the use of impure benzoyl chloride. I tried in all ways that I could devise to obtain a satisfactory precipitate with what was thought to be a perfectly satisfactory preparation, but had no success in about two weeks' work. I then secured some benzoyl chloride from another source, and afterward met with absolutely no difficulty in carrying out the method. The first specimen was undoubtedly faulty, though it was not evident in what way, and I made no serious attempt to learn what was wrong. In carrying out the method one should be careful to shake the mixture gently at first in order to avoid producing an emulsion. If shaken gently for ten minutes, or thereabouts, and then more vigorously for about twenty or twenty-five minutes, the esters precipitate extremely well and can be washed readily. I found it unnecessary to shake the mixture for "at least one hour," as recommended by a number of writers. Finally, Salkowski recommended that the mixture be shaken for a half-hour and then stood aside overnight before filtering. This is, I think, unsatisfactory. I have had good flocculent precipitates become sticky and impossible of filtration after such a procedure. The esters tend to become sticky after standing even when they have been washed and placed in a closed vessel over sulphuric acid.

The figures for control estimations were introduced into the table merely to show that absolutely exact results are not obtained by the method. It has been the general experience that control estimations are likely to show variations in results as large as 10 per cent. or more.

My results show this in most instances. Two estimations were made every day after the first, the whole process being carried out separately in each case, even in precipitating the phosphate before adding the benzoyl chloride. Exactly the same amount of urine, of benzoyl chloride, and of sodium hydrate was used in each estimation, the mixtures were shaken for the same length of time, cooled in the same manner, filtered coincidentally, and each was washed just to the point where the filtrate became neutral, yet the decided variations shown were not avoided. These variations are, however, not sufficient to make the method of questionable value when used only as an index and when, as in the work herein reported, small variations have no influence upon the conclusions reached.

v. Alfthan states that his results in estimating the esters in a normal subject throughout a series of twelve days showed figures varying from 1.5 grammes to 5.1 grammes. My patient showed much more constant excretion. When taking large quantities of fluid the esters varied only between 2.099 grammes and 2.897 grammes, exclusive of the wholly erratic result on February 8th. The amount fell when the fluid was reduced, but there was only slight subsequent variation, the figures ranging only between 1.768 and 1.288. Since this man was on constant diet, and there is no statement that such was the case with v. Alfthan's (normal) subject, who showed such marked variations, it seems to me extremely probable that the amount of carbohydrates in the normal urine depends largely upon the diet, and that these carbohydrates are in large part at least derived from the food rather than formed in the body. I would say again, however, that this question is still widely open.

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CONCLUSIONS BASED UPON THREE HUNDRED AND THIRTY OUTBREAKS OF INFECTIOUS DISEASES SPREAD THROUGH THE MILK-SUPPLY.

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IN view of the importance of milk as an article of diet for all classes, but especially infants, invalids, and the sick and convalescent, it is perfectly natural that much attention should have been given to the study of this food-stuff, and that of late years the sanitarian and bacteriologist should have found it a profitable field for research.

Few countries until recently have deemed it necessary to do more than prevent adulteration of the milk, and some of the legislators appear to think that as long as the milk has not been skimmed or watered, and contains the standard of total solids and fats, we need not worry about the germs we eat or drink. This may be a pleasing reflection to persons who do not know that such hydra-headed diseases as scarlet fever, diphtheria, and cholera infantum have been disseminated in the milk-supply, that typhoid fever epidemics have been thus caused, and that milk may be the vehicle of the germs of tuberculosis and other infectious diseases and morbid agents.

Time will not permit me to do more than briefly point out some of the circumstances under which milk may be the cause of disease.

1. Sour milk, or milk which is on the point of turning, is very liable in infants, children, or persons with feeble digestion to produce gastric and intestinal catarrhs of an acute or chronic character. In the more acute cases, in bottle-fed children, we have the phenomena of cholera infantum. The causes of untimely acidity of the milk are improper feeding of the animals, dirty milk-pans and rooms, unclean udders and teats, and a high temperature.

Every consumer of milk has doubtless observed the presence of more or less foreign matter found at the bottom of the vessel or bottle in which it is kept; indeed, it is a matter of such common occurrence that it hardly excites our attention. If these sediments are subjected to microscopical examination we will find that they are composed of epithelial debris, hairs of the cow, organic and inorganic dust particles, bacteria, fungi, and spores of every description, and last, but not least, excrementitious matter from the cow, which adhering to the udder, or other parts of the animal, gained access to the bucket in the act of milking. Unfortunately, fully 90 per cent. of the bacteria found in

¹ Abstract of a paper read before the Section of Hygiene and Epidemiology of the International Medical Congress, Paris, August, 1900.

such specimens are fecal bacilli, which multiply with astonishing rapidity and hasten decomposition of the milk. Dr. Plant found, as a rule, that in warm weather the so-called fresh milk delivered in the morning has already passed the period of safety and is unfit for use by young children, on account of undue germ development, and sees in this the most frequent cause of cholera infantum and the summer diarrheas in bottle-fed children.

In April and May, 1898, Dr. E. A. de Schweinitz, of the Biochemic Laboratory of the Department of Agriculture, examined thirty-one different samples of milk from as many dairy wagons in Washington. Of these one showed only about 4000 bacteria per c.cm.; one, 2500; five others between 10,000 and 15,000; six between 30,000 and 50,000, and the remainder more than 50,000 per c.cm., in several instances running over 115,000 per c.cm. In those cases where the number of bacteria per c.cm. was small it is fair to presume that the milk was collected with considerable care; the other cases, he adds, speak for themselves.

As a matter of fact, Bitter, an authority on sanitary milk, claims that the maximum limit for milk that is fit for food is 50,000 germs per c.cm. On this basis the milk from only about thirteen out of thirty-one dairies in Washington examined by Dr. de Schweinitz was fit for food. Dr. Turner, the Dairy Inspector of the District, during the fiscal year ending July 1, 1899, examined bacteriologically 117 different samples of our market milk, and found only 52 of the 117 samples to contain less than 50,000 per c.cm.; indeed, some of the samples showed a higher number of bacteria than the sewage water of the city, which statement, he adds, "is not pleasant to ponder over."

2. Milk may be rendered unfit for use and cause sickness in children by reason of improper food of the animal, or while the animal is being treated with strong remedial agents, which may be excreted in the milk. The symptoms of poisoning from arsenic, copper, iodine, lead, mercury, tartar emetic, atropine, colchicum, croton oil, strychnine, veratrum viridis, etc., has been thus observed.

3. Milk itself may be morbid as the product of a diseased animal. Dr. Busey and myself have elsewhere pointed out that inflammatory conditions of the udder and teats, especially the condition known as garget, are doubtless responsible for a large number of cases of pseudodiphtheria and other septic infections. The milk of animals suffering from acute specific enteritis, puerperal and other septic fevers, foot-and-mouth disease, cowpox, anthrax, pleuropneumonia, rabies, and tetanus has also been known to produce sickness in the consumer.

4. It has been shown by Ernst, of Harvard, that three out of twenty-five samples of Boston milk transmitted the germs of tuberculosis in the animals experimented upon, and Dr. Fries found that the ordinary

market milk of Copenhagen proved infectious in six out of twenty-eight rabbits, showing a corresponding degree of danger to delicate infants, and of which Dr. Busey and myself have collected a large amount of clinical evidence.

5. Milk may acquire infective properties after it leaves the udder of the animal. Numerous instances have been observed in which outbreaks of typhoid fever, scarlet fever, and diphtheria, by their sudden and explosive character, affecting families living in streets and localities supplied by the same milkman, naturally pointed to the milk-supply as a common cause. Dr. Michael Taylor, however, was the first physician (in 1857) to point out definitely that cow's milk might serve as the medium of spreading typhoid fever from a dairy where the disease prevailed. In 1867 he also showed that scarlet fever might be distributed in the same way. In 1877 Mr. Jacob traced a diphtheria epidemic at Sutton to the milk-supply, and in 1872 Macnamara traced an outbreak of cholera at Calcutta to an infected dairy. These facts could not fail to sharpen the powers of observation in others, and in consequence similar outbreaks were more frequently reported, so that Mr. E. Hart, the editor of the *British Medical Journal*, was enabled to present to the International Medical Congress held in London in 1881 the history of fifty outbreaks of typhoid fever, fifteen of scarlet fever, and seven of diphtheria, all traceable to the milk-supply. In a similar communication made before the International Medical Congress at Paris, in 1900, the writer presented his conclusions based upon the tabulated histories of 330 outbreaks of infectious diseases spread through the milk-supply; these outbreaks consist of 195 epidemics of typhoid fever, 99 epidemics of scarlet fever, and 36 epidemics of diphtheria.

It has been demonstrated by numerous bacteriologists that disease germs may not only survive, but in many instances actually proliferate, in the milk, and it is not a difficult matter to point out the many ways by which these germs gain access, especially when some of the employes are also engaged in nursing the sick, or are suffering themselves from some mild infection while continuing their duties, or are convalescent from the disease.

It is quite conceivable how animals wading in filth and sewage-polluted water may infect the udder with the germs of typhoid fever and through it the milk. We can also appreciate how infected water may convey the germs by washing the utensils or by deliberate adulterations. Infection may also take place through the agency of scrubbing-brushes, dishcloths, exposure to infected air, and the agency of flies.

Of the 195 epidemics of typhoid fever tabulated by me there is evidence in 148 of the disease having prevailed at the farm or dairy. In

sixty-seven instances the infection probably reached the milk by percolation of the germs into the well-water with which the utensils were washed; in sixteen of these the intentional dilution with water is a matter of evidence. In three instances the bacillus coli communis and the typhoid germs were demonstrated in the suspected water. In seven instances infection is attributed to the cows wading in sewage-polluted water and pastures; in twenty-four instances the dairy employes also acted as nurses; in ten instances the patients while suffering from a mild attack, or during the onset of the disease, continued their work, and those who are familiar with the personal habits of the average dairy hands will have no difficulty in surmising the manner of direct digital infection. In one instance the milk-tins were washed with the same dishcloth used among the fever patients. In two instances dairy employes were connected with the night-soil service, and in another instance the milk had been kept in a closet in the sick-room.

Of the 99 epidemics of scarlet fever the disease prevailed in sixty-eight instances, either at the dairy or milk farm. In six instances persons connected with the dairy either lodged in or had visited infected houses. In two instances the infection was conveyed by means of infected bottles or milk cans left in scarlet-fever houses. In seventeen instances the infection was conveyed by persons connected with the milk business while suffering or recovering from the disease, and in at least ten instances by persons who acted as nurses while handling the milk. In three instances the milk had been stored in or close by the sick-room. In one instance the cans had been wiped with an infected cloth. In nineteen instances the infection was attributed to disease of the milk cows, such as puerperal fever and inflammation of the udder and teats; but these outbreaks were probably not genuine scarlet fever, but a so-called streptococcus or staphylococcus infection, the symptoms of which closely resemble those of scarlet fever.

Of the 36 outbreaks of diphtheria tabulated there is evidence that the disease prevailed at the dairy or farm in thirteen instances. In three instances the employes continued to handle the milk while suffering themselves from the disease. In twelve instances the disease is attributed directly to the cows having inflammatory conditions of the teats and udders. These instances, however, may be regarded as typical examples of streptococcus and staphylococcus infection, giving rise to a form of follicular tonsillitis or pseudodiphtheria, often difficult to distinguish clinically from true diphtheria or scarlet fever.

It is interesting to note that of the 330 epidemics analyzed by me 243 have been recorded by English authors, 52 by American, 14 by German, 11 by Scandinavian, and 5 each by French and Australian writers. This is probably due to the fact that the English and Ameri-

cans usually consume raw milk, while on the Continent the milk is rarely used without being boiled.

A review of the evidence in milk contamination both in this country and Europe shows that the laws which have been enacted to protect the public deal largely with the prevention of milk sophistication, and even in this respect have fallen short of their aim; indeed, it is doubtful whether legislation in matters of this kind is as effective as public education. The importance of a pure milk-supply was recognized as early as 1878 in connection with some of the milk-cure establishments in Germany. The system then originated has been improved by time and experience and lately introduced into several of our larger cities. Such a sanitary dairy was inaugurated in Washington in 1897. The farm and herd, the employes and general manipulation of the milk, are under the supervision of a committee appointed by the medical society and subject to frequent, unannounced inspection. As a result of strict cleanliness and attention to details the average number of bacteria per cubic centimetre during the year 1899 was 6485 in the raw milk against 52,000 per c.cm. as found in the market milk; but it must be remembered that this is only one dairy, whereas at the close of the fiscal year of 1899 there were in force 152 permits for the maintenance of dairy farms in the District, 390 for the maintenance of dairies, and 600 for the importation of milk; hence there is ample room for the establishment of sanitary dairies, which appear to offer by trade competition the best solution of an important problem. Those who are familiar with the surroundings of our milk farms and the habits of the average dairy employes need no arguments for the necessity of sanitary reforms and additional legislation upon the subject. To indicate the value of milk inspection to the health of the community, I may say that in 1893 there were not less than 451 deaths from diarrhoeal diseases of children under five years, while in 1898, when the inspections extended over only about one-third of the source of our milk-supply, the number of deaths from the same cause was but 231, showing a decrease of about 50 per cent.¹

The importance and value of this work, according to Dr. Woodward, was also demonstrated during the past year by the discovery of an outbreak of scarlet fever due to the presence of an undiagnosed case of this disease on one of the farms which supplied milk throughout the city. Before this outbreak, however, was checked the number of cases traced to this milk-supply amounted to sixty-five. The ability of the Health Department to check the outbreak was due entirely to the law regulating the sale of milk enacted in 1895, upon the recommendation of the Medical Society of the District of Columbia.

¹ Report of the Health Officer of the District of Columbia, 1899.

LARYNGEAL HEMORRHAGE FROM AN APPARENTLY
NORMAL LARYNX.

BY GEORGE B. WOOD, M.D.,

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THE spitting of pure blood or other expectoration streaked with blood is to be considered not as a disease but as a symptom to be found in many and various pathological conditions. Yet this symptom, when unprovoked, impresses the patient in whom it occurs with the idea that he is suffering from tubercular disease of the lungs, and in a large majority of cases this impression is correct. It is, however, fortunate that hemorrhage from the larynx, leading to the expectoration of either pure blood or blood-streaked mucus does sometimes occur in curable cases, but it is only exceptionally that the bleeding can be traced to an otherwise normal larynx. In tuberculosis, in syphilis, in cancer, and other diseases which lead to ulceration we frequently find corrosion of bloodvessels which may cause serious if not fatal hemorrhage. In hemorrhagic laryngitis there is frequently more or less oozing of blood, though never to any great amount; and the lodgement of sharp-pointed foreign bodies or other traumatism, such as fracture of one of the laryngeal cartilages or the hyoid bone, may be productive of a rather severe amount of hemorrhage. It must be conceded, however, that cases of laryngeal bleeding, unprovoked by some local cause, are exceptionally rare, and in a rather careful search through the literature since 1890 I have been able to find only six cases. These few cases I give in abstract.

No. 1. Terras¹ reported a case of bleeding from the larynx occurring in a girl, aged twenty years, who had not yet menstruated. With the laryngo-scope an eroded vessel was found close to the base of the right arytenoid cartilage.

No. 2. Charles Gernert² reports a case of laryngeal hemorrhage occurring during an attack of hoarseness. The bleeding-point was located at the juncture of the middle and anterior third of the left vocal cord.

No. 3. Labet-Barbon³ reports a case in which there was marked oozing of blood from the right vocal cord, in a patient who suffered from cirrhosis of the liver.

No. 4. Von Geyer⁴ reports the case of a woman, aged forty years, who had been hawking clear fluid blood for the past seven weeks.

¹ Meeting of the Société Française de Laryngologie, etc., May, 1895.

² *La Belgique Méd.*, 1895, No. 42.

³ *Journal of Laryngology, Rhinology, and Otology*, 1898, p. 149. Abstract.

⁴ *München. med. Wochenschrift*, April, 1898.

Examination of the larynx showed a bleeding bluish-red tumor about the size of a currant, just below the petiolus of the epiglottis. This was removed by thyrotomy, but very shortly afterward returned. It was again removed, this time interlaryngeally, and a bleeding vessel was found underneath the tumor which was now seen to be simply a small clot of blood.

No. 5. Howard S. Straight¹ reports two cases of laryngeal hemorrhage.

CASE I.—A man, aged thirty-seven years, had had repeated hemorrhages from the throat for fourteen years; at first they occurred very infrequently, but during the last seven years they had been coming on at intervals of from a few weeks to a few months. He had never suffered from any catarrhal trouble except a slight hypertrophic rhinitis, and a general examination revealed nothing abnormal. The blood-vessels, however, of the larynx, epiglottis, and base of the tongue were seen to be considerably engorged. The first examination did not discover the actual point of bleeding, though made within a few hours after he had expectorated blood. The bleeding came on after singing, which exercise also increased the engorgement of the laryngeal blood-vessels. It was thought that the bleeding most surely came from the larynx, though the actual point was not discovered.

CASE II.—A man, aged thirty-five years, had expectorated blood at widely varying intervals for the last sixteen years. Up to the time of examination the bleeding was never profuse, and the only abnormality which could be detected either locally or generally was a bleeding-point consisting of a minute ruptured bloodvessel, situated in the anterior third of the left vocal cord. The bleeding kept up in spite of all treatment, always coming from the cords without any apparent cause, and the man finally died from profuse hemorrhage of the larynx.

In glancing over the cases it will be seen that No. 1 was probably a case of spurious menstruation; that in No. 2 there may have been more or less marked laryngitis, giving rise to the hoarseness complained of; and in No. 3 there was cirrhosis of the liver, probably giving rise to more or less congestion of the veins all over the body. In the other three cases no cause for the bleeding could be detected.

Submucous hemorrhages of the larynx, either resulting from marked active congestion or inflammation, or from overuse of the voice or from severe coughing, are not very uncommon pathological conditions, numerous cases of these having been reported; but as seen by the few cases which I have been able to find active bleeding unaccompanied by destructive disease of the larynx is of very rare occurrence. I desire to put on record the following case, which I believe is of interest because of its rarity.

Mr. D., aged thirty-six years, has been a healthy man all his life. He was somewhat addicted to alcohol, though never excessively so.

¹ Journal of Laryngology, Rhinology, and Otology, 1899, p. 91.

He came to me first on August 10, 1899, spitting up a small quantity of bright-red blood every few minutes. There was no cough accompanying the expectoration. He simply, with a very slight hawk, was able to eject the blood or bloody mucus from his mouth. On the morning of his visit, while chewing a toothpick (to which habit he was more or less inclined) a piece lodged in his throat, causing considerable though temporary cough. An hour or so later he began to spit blood. Naturally his mind turned with dread to the thought of consumption, and he came chiefly to find out whether he was a sufferer from that disease. His lungs, which were examined by Dr. H. C. Wood, Jr., were found to be in perfect condition. Besides, there was no loss of weight, no chronic cough, nor any other reason outside of the bloody expectoration to suspect tubercular disease. Local examination showed the nose to be normal, except for a small septal ridge on the left side, and no blood could be detected by anterior rhinoscopy. The vault of the pharynx, however, was seen to be flecked with small blood clots, likewise the posterior pharyngeal wall and the lingual tonsil, the latter being somewhat enlarged. With the laryngoscope the arytenoid cartilages and the intervening fold of mucous membrane were seen to be red and covered with fresh blood, which was evidently coming from the larynx. The vocal cords and anterior wall of the trachea were also covered with blood. The actual bleeding spot could not be determined. Supposing at that time the case to be one of traumatism, caused by the lodgement of a portion of the toothpick, I gave a favorable prognosis, and ordered potassium bromide and fluid extract of ergot. On the following afternoon, when I saw him, the bleeding had stopped, and there was no sign of blood in either pharynx or larynx, except a small red point at the anterior end of the left vocal cord, possibly the source of the bleeding. Careful re-examination of his lungs and heart gave negative results, though he complained somewhat of palpitation. I ordered tincture of aconite in small doses for a while, and did not see him again until February 13, 1901. He then came back to me with practically the same symptoms as at his previous visit, except that at this time the bleeding had started from apparently no cause. He had given up the habit of chewing toothpicks, and was in perfect health up to the time when the desire to expectorate showed the hemorrhage to have started. He had not overtaxed his voice, nor had he exerted himself in any manner sufficiently to act as an exciting cause of the bleeding. During the summer of 1900, while I was out of town, he had had another attack of bleeding, which had ceased spontaneously. The patient during the last two years had not lost weight; had not suffered from cough; but had had occasional attacks of dyspepsia. On examination the nasal fossae were found to be free from blood, likewise the vault of the choanae. No blood clot or other sign of bleeding could be detected in either the fauces or oropharynx, but a number of clots were seen on the epiglottis and the vocal cords were covered with bright red blood. A thin streak of blood was noticed running down the anterior wall of the trachea.

I consulted with Dr. Freeman, who believed that the hemorrhage came from the larynx, and almost surely from a spot just below the anterior commissure. He called my attention to the condition of marked dilatation of all the veins of the gums, of the pharynx, and of the larynx. The bleeding was temporarily controlled by local applica-

tions of suprarenal extract, though it returned again in very slight quantity three or four hours later. Another careful examination by Dr. H. C. Wood, Jr., to detect any possible disease in the other organs of his body gave negative results, except for a marked oxaluria. For this latter condition he was put on nitrohydrochloric acid, and the oxalates rapidly disappeared from his urine. When I saw him on February 22d, nine days after the hemorrhage, the engorgement of the veins of the mucous membranes of his throat and larynx had considerably diminished, and he had had no bleeding since the day of his visit.

In looking over this case for any assignable cause for the hemorrhage I can find nothing at all which seems to me conclusive. There was undoubtedly an abnormal condition of the bloodvessels—"a predisposing cause;" but in this last attack, as also in the one occurring when I was out of town, no direct cause could be detected. Also, it seems hard to believe that the dilatation of the veins was due to his condition of oxaluria, though the coincident decrease in the size of the vessels following decrease in the amount of oxalates in the urine was somewhat suggestive. In such cases as that reported by Lubet-Barbon, No. 3, where there exists a marked pathological condition like cirrhosis of the liver, giving rise to dilatation of the veins all over the body, it is easily conceivable how some slight unappreciable trauma may cause rupture of the veins; but in such a case as reported by Straight, where from apparently no cause whatsoever a man began to expectorate blood, which in spite of all treatment kept up until death finally intervened, a direct result of hemorrhage, we as diagnosticians must acknowledge defeat.

Of course, it is not inconceivable that in the case from my own experience there may exist some slight tubercular focus in the lung; unprogressive but sufficiently active to cause the rupture of a small bloodvessel; but the probability of such a condition seems for the following reasons infinite in its minuteness:

1. No recognizable symptoms of tubercular disease could be detected.
2. The blood, though apparent in the trachea, was evidently running downward and not upward, existing as a small narrow streak on its anterior wall.
3. The blood was expectorated easily, without cough.
4. The point of bleeding was thought to have been found just below the anterior commissure in the last attack, and on the anterior end of the left vocal cord at his first visit.
5. The temporary cessation of bleeding following the local application of suprarenal.

Of course, if at a later date tubercular disease develops in this case it would point very strongly toward an explainable etiology, though I cannot admit that it would be a positive indication of present tubercular trouble.

BLASTOMYCETIC DERMATITIS OF THE GLUTEAL REGION.¹

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THE history of this case is somewhat incomplete on account of the patient's mental condition, but so far as obtainable it is as follows:

Family History. The patient is a woman, aged seventy-eight years. Both her father and husband died from unknown causes. Her mother died of phthisis. She has had nine children: one daughter has phthisis, one son is living and well, one child died in infancy, two children died of yellow fever, and four are dead of causes unknown to the patient.

Past History. The patient was born in Germany; lived in New Orleans for forty years, during which time she had yellow fever. She never had any other illnesses, denies venereal infection, and there are no stigmata present. She has lived in Chicago for the past ten years.

Present History. Patient's present trouble commenced nearly four years ago, when she noticed a pimple on her left hip, which became a roughened area of intense itching, and later, on account of scratching, became apparently denuded of epithelium. The growth gradually increased in size and the itching persisted, but of much less intensity.

She was admitted to the Cook County Hospital as a case of syphilitic ulcer. A piece of the growth was excised and on microscopical examination a diagnosis of epithelioma was made and the patient transferred to the surgical service of Dr. Charles Davison, who has kindly permitted me to report the case.

The growth is on the upper posterior part of the left gluteal region; it is oval in outline, measuring 11 cm. long by about 6 cm. wide. The entire growth is movable on the underlying tissues. The border is quite hard, elevated about 8 mm., and in places the growth can be felt extending out into the surrounding skin. From the inner side of the border papillomatous growths overhang the floor; they are of various sizes, the largest measuring 2 cm. long. Most of these villous-like projections bear secondary and tertiary growths of a smaller size, the whole being covered with epithelium, giving them a bluish-white color similar to venereal warts. At no point on the border is there an area of ulceration indicating an extension of the process (Fig. 1).

The floor is covered with small fungoid epithelial growths similar to those projecting inward from the border. These papillae vary in size from a small elevation to 0.5 cm. in height. Here and there among these elevations are darker red areas of ulceration, the whole floor being more or less covered with a hemorrhagic exudate. Extending in a diagonal direction nearly across the growth is a band of uninvolved skin about 2 cm. wide.

There are no secondary growths near, or, in fact, on any part of the body; but on the bridge of the nose is a hard, non-ulcerated, sessile tumor about the size of a hazel-nut. It is freely movable on the bone,

¹ Read before the Chicago Pathological Society.

but the skin is closely attached to it. On the surface are seen several dilated bloodvessels. This little tumor is painless. It has been there for the past twenty years, and the patient thinks it is due to the irritation of a pair of brass spectacles. It bears no resemblance whatever to the growth on the hip, and microscopical examination shows it to be an endothelioma.

The patient complains only of the itching, which is much less intense than when the growth started, but which at times interferes with walking; there has been no actual pain at any time. The neighboring lymph glands are but slightly enlarged.

Pieces of the hip lesion were fixed in 4 per cent. aqueous formalin, dehydrated in alcohol, cleared in benzole and cedarwood oil, embedded in paraffin, and stained by various methods. The best results were

(FIG. 1.



obtained with eosin and polychrome methylene-blue, but hæmatoxylin, followed by Van Gieson's stain, gave good results, as did also Weigert's elastic-tissue stain. Sections stained for tubercle bacilli were negative, as were those stained by Gram's method.

Microscopical Appearance. Some distance outside of the growth the skin is normal, but on approaching the affected area the interpapillary processes of the rete mucosum are seen to extend deeper into the corium, and instead of being regular in form they often have knob-like projections from their sides, as if they were budding, and at their lower extremity they often bifurcate to enclose a mass of corium. This irregularity increases the nearer we approach the growth. At the edge of the growth we see the papillomatous outgrowths extending over the floor. They are seen to be formed by an extension of the

corium, covered on both surfaces with epithelium, which extends into the interior in irregular projections.

In this core, so to speak, are irregular isolated masses of epithelium, many of which are hollow and contain corium infiltrated with round and plasma cells and leucocytes. Occasionally in these islands of epithelium we find the military abscesses which are so characteristic of this disease.

The floor of the growth shows villous projections similar to those described as growing inward from the border. From the surface of the floor there is a marked hyperplasia of the rete mucosum, which dips down into the corium in coral-like projections, branching in different directions or subdividing to enclose masses of the corium. Sometimes the cells in the centre of these epithelial down-growths have

FIG. 2



Budding form of blastomycetic organism. (BAUSCH and LOMB, $\frac{1}{12}$)

become cornified and taken on a concentric arrangement simulating the pearls of epithelioma.

In other places are seen military abscesses, composed mostly of collections of polynuclear leucocytes, desquamated epithelial cells, more or less granular material, an occasional giant cell, and the specific organism. These abscesses are surrounded by flattened epithelial cells, the prickles of the outer layers being well preserved. The abscesses are most numerous deep in the corium, where the organisms and giant cells are also more common. The giant cells are of the tuberculous type; they are found more abundantly in the areas of round-cell infiltration which are present here and there, and especially where a military abscess has ruptured; once in a while a giant cell is seen containing the blastomycetic organism (Fig. 2).

The organism is the typical double-contoured circular or oval body having a mass of deeply staining, granular protoplasm, which is usually eccentrically placed, often containing one or more vacuoles. The organisms vary much in size and are found in groups of two or more, usually in the different stages of budding. They are not so numerous in this case as in some of those previously reported. They show a tendency to occur in the periphery of the abscesses or free in the corium where an abscess has ruptured, and are often surrounded by a granular material which takes the eosin stain. I have been unable to find any organisms free in the rete or in the necrotic material covering the ulcerated areas.

The corium is well preserved and very vascular; the entire tissue is more or less oedematous and shows a marked infiltration with leucocytes, which while most numerous in the miliary abscesses are also seen in great numbers between the cells of the epithelium, seemingly working their way toward the surface. There are vast numbers of polynuclear eosinophiles and plasma cells in the corium; mast cells are also not uncommon.

The appendages of the skin, hair follicles, and glands have entirely disappeared.

Unfortunately there were no cultures made from this case.

The treatment consisted of complete excision of the affected area and the sliding of cutaneous flaps to cover the defect. With the exception of some sloughing of the flaps and the development of a pleurisy with effusion, the patient has made a satisfactory recovery, and there is no evidence of recurrence.

SUBINVOLUTION OF THE UTERUS: THREE SUGGESTIVE CASES.

By L. W. ATLEE, M.D.,
OF PHILADELPHIA.

SOME apology may seem to be due for a paper on so familiar a subject, but one will search and find but few articles in medical journals and society reports devoted to gynecological subjects which are not of a surgical nature; very few, indeed, on the therapeutic use of medicines. Gynecology, it is true, is largely surgical, and without surgery would be relegated to its position of nearly half a century ago. "That the pursuit and report of surgical procedures are in many ways more satisfactory than the investigations of the virtues of medical remedies—more satisfactory because of the brilliancy of execution, the certainty of results, and a higher remuneration—we all appreciate." A satirist has defined therapeutics to be the art of introducing a medicine of which we know little into a body of which we know still less. *Ars medica tota est in observationibus*. "One of the most elementary requirements of science is the power of distinguishing between real and merely apparent causes. . . . It is indeed a power most rare among therapeutists as well as most difficult to exercise, so strong is the ten-

dency of human nature to take to itself the credit of all the good that arises under the operations of natural laws.

The tendency of the modern text-books to omit to describe old and well-established successful methods of treatment simply because they are not new, and thus to limit themselves to the newest methods only, cannot but result to the coming medical man in a certain loss of his usefulness and increase of his power to do harm. Library gynecologists may be all very well, yet "there are many who are getting their first personal experience in this new decade who readily accept their teachings as indisputable doctrine, promulgated *ex cathedra* for their guidance. Indeed, there is such a disposition in these days of startling innovation to fall in with the latest drift of thought without sufficient test of its claims that not infrequently valuable methods of practice are too easily allowed to be discarded for the sake of the new love, which often proves to be fickle and unreliable."

This neglect of the old methods is brought about apparently not so much by their having proved themselves valueless, but by the fear of the writers that they themselves may not be considered quite "up to date" and *fin de siècle*, the result being that the old methods are entirely ignored or are relegated to such an inconspicuous place that they appear only as secondary to the latest and practically untried forms of treatment. The latter are freely quoted from, and especially the names of Germans who hold the most advanced views and are swayed by the least surgical morals.

In the words of Senn, "The *favor operativus* has been carried too far in the present time in this department of surgery as well as in nearly all others. . . . A remunerative fee or the fear that the patient will get into the hands of his competitors often deadens his sense of moral obligation toward his patient when he renders his final judgment concerning the propriety of an operation."

By the term subinvolution we mean the condition which results from imperfect involution of the uterus after labor, abortion, or miscarriage. This form of hypertrophy of the womb, Courty tells us, "is pathological only because of its permanence, but physiological in its origin." The importance of this condition and its power to produce harm cannot be overestimated, for Thomas, of New York, declares: "Arrest of involution of the puerperal uterus is an occurrence of very great frequency. It constitutes the chief cause of all chronic uterine disorders, and for this reason its importance cannot be overestimated."

Mrs. C., aged twenty-three years, a well-nourished woman, rather anæmic; first seen nine weeks after the birth of first child. Had been attended in labor by a physician. I learned from the nurse, who had been recalled again to take care of her while confined in bed, that

immediately after the child was expelled the woman had an attack of eclampsia, and after this she did not regain consciousness until the following day. In reply to my questions as to what the attending physician had done at the onset of the convulsion, she said, "He jumped up and ran off to the nearest drug-store to telephone for assistance," and later the consulting physician had removed the placenta; there had been but little loss of blood. She suckled the child. The woman had got up on the eighth day and attended to her housework, but feeling weak and easily fatigued. There was a constant sacral and hypogastric uneasiness amounting in the evening to pain. She also had a profuse leucorrhœa, the discharge at times being streaked with blood.

Some three days before this visit she found herself unable to extend her legs without causing severe pain in the iliac region. She then took to her bed. There was a slight rise of temperature; the tongue was clear and the appetite excellent. Lying on her back she could extend her legs without pain; it was only on trying to stand erect that the pain was brought on. Examination revealed the fundus uteri slightly above the symphysis pubis and tender on pressure from the abdominal walls; there was no tenderness elicited by pressure at the sides of the uterus in the ovarian and tubal regions. Vaginal touch showed the external os patulous, and pressure on the body of the uterus at all points attainable through the vagina by the finger showed tenderness.

Having thus a perfectly plain case of subinvolution of the womb following labor and accompanied by endometritis, the following treatment was resorted to, which has given reason to be well satisfied with its results in many other cases of this nature:

First, to produce daily evacuation of the bowels she was given a drachm of sulphate of magnesia half an hour before breakfast. It has been found best to give this to these cases in a solution with aqua menthæ piperitæ, 1 drachm to half an ounce, to be taken in a half-glassful of water. If told to take a teaspoonful of salts it does not have the same mental effect, which no one of experience despises; also 100 one-grain Bonjean's ergotin pills were ordered, one of which was to be taken an hour after meals. The only topical application used was one gallon of water at 110° F., twice a day, in the dorsal position, with the hips well elevated. She was told to eat plenty of good, wholesome food and remain in bed as long as it was painful to stand erect.

Two weeks after this she reported at my office, the pain and soreness having disappeared; she had been out of bed for five days. The first ten days after getting up the leucorrhœal discharge had recommenced, but had now entirely ceased. Examination per vaginam showed the patulous condition of the os to have passed away; the uterus was still enlarged, but not tender on pressure. She was advised to continue the ergotin and use one douche a day, and a ferruginous tonic was ordered in addition (*ferri et quinice citratis cum strychnine*, gr. 10, in *vini xerici*, $\frac{1}{2}$ ounce, a. c., t. i. d.). When seen a month

after this visit she was perfectly well. On this occasion the child needed the attention.

Mrs. H., aged thirty-two years, a large, robust woman, weighing some 200 pounds, came complaining of excessive menstrual flow for the past week and of leucorrhœa previously. During part of this time she had been travelling from her home in Wisconsin. About five weeks ago she had an abortion performed by her attending physician at her home. She had lost considerable blood at this time. She knew nothing as to whether the whole contents of the uterus had been expelled or not. Her general health was excellent, tongue clear, and appetite good, but she complained of a feeling of fullness and sense of weight in the pelvis, with slight pain at times in the left ovarian region. Examination per vaginam with the finger showed the os externum very patulous, large, and soft, and directed toward the hollow of the sacrum. The uterus was as large as the third month of pregnancy and anteverted, the fundus being tender on pressure in the anterior vaginal fornix, where it was easily delineated.

This woman did not want to be laid up; she was on a pleasure tour and desired to leave immediately for the New Jersey coast to enjoy the sea air and baths. What she desired was some form of treatment that would permit of her doing this. She was advised to keep on her back as much as possible, to use the hot vaginal douches once a day, and internally to begin with a single dose of two grains of ergotin, then every four hours one grain was to be taken until the bleeding ceased; then she was to finish her box of pills (100), taking one grain one hour after each meal. The bowels were to be freely moved daily by saline laxatives.

A letter was received four weeks after her visit reporting her as feeling perfectly well; all the pelvic symptoms had disappeared; the leucorrhœa ceased after taking the ergotin and douches for two weeks. She had continued the use of both until the date of the letter and desired to know if a continuance of the treatment was necessary. She was instructed to wait until after the next menses and report again as to the amount and continuance, also should the leucorrhœa recommence afterward. In due time she wrote that the menses had been entirely normal and no discharge followed.

Mrs. Fitz—, aged thirty-eight years, a large, stout woman who had borne twelve children. She sent her husband for me owing to profuse menstrual flow, which had caused her great anxiety. Nine weeks previously she had been confined with a full-term, stillborn child, which she said was perfect in every way. During the first stage of labor she had lost a good deal of blood, and her accoucheur had told her the "after-birth was first." The labor otherwise was natural and short. She felt well enough until she got up and resumed her household duties, when she began to have a profuse leucorrhœal discharge, a feeling of dragging in the pelvis, frequent and painful micturition during the day, and a general tired feeling and disinclination to move. There was no sacral pain or headache, but she was costive, needing laxatives to have any movement from the bowels. She was anemic. The tongue was clear and she had no fever. Digital examination per vaginam showed an old, extensive perineal rupture; the uterus was low down, close to what should have been the perineum; it was large

and soft and slightly tender when palpated between the vaginal finger and abdominal hand. The os was open, soft, and patulous, the whole vaginal portion being enlarged and elongated.

She was advised to remain in bed until the bleeding stopped and given one grain of ergotin every four hours until it did so. After this she was to use one grain of ergotin three times a day for one month. After the menstrual period was over she was to use twice a day the hot vaginal douche also until the next menstrual period, and then after the period to report her condition. A large rubber ring-pessary was introduced, which kept the uterus in fairly good position. She came to the office at the time specified and said she was very comfortable; all the symptoms had been relieved and the menstrual period just past had been quite normal. The uterus was much reduced in size and no longer tender on pressure, and the os was well closed; the leucorrhœa had ceased for some time.

To Sir James Y. Simpson we owe the first scientific explanation of the condition known now as subinvolution, as previous to his paper published in the *Edinburgh Monthly Journal of Medical Science* for August, 1852, the enlarged uterus had been regarded as a form of metritis and its treatment had been most unsatisfactory. This article was embodied in the posthumous volume of his writings. In it he tells us: "The enormous increase which occurs in the parietes of the uterus during the nine months of pregnancy has long attracted the attention of professional observers. It is a kind of physiological hypertrophy, unequalled either in regard to its magnitude or its rapidity in any other organ in the adult human body; for during the forty weeks of uterogestation the uterus enlarges from nearly three inches in length and one and three-quarters inches in breadth, to twelve or fifteen inches in length and nine or ten inches in breadth. It increases from about two ounces in weight to twenty-five or thirty ounces. The cavity of the uterus before impregnation is less than one cubic inch, while at the full term of pregnancy it is extended to above 400 cubic inches; and the surface of the organ increases from about five or six square inches to nearly 350 square inches. Before impregnation the cavity of the uterus would not hold above a drachm or two of fluid; at the ninth month of uterogestation its contents usually weigh from 120 to 150 ounces.

"The rapidity, however, with which the uterus diminishes in size after delivery is, perhaps, still more marvellous than the rapidity with which it increases in size after impregnation. While the human uterus takes forty weeks to attain the dimensions pertaining to the fully developed state of pregnancy, it requires, on the contrary, from four to eight weeks only to decrease from the extreme size of the organ peculiar to pregnancy down to the small size peculiar to the same organ in its unimpregnated condition.

"But in the vital mechanism of the involution or reduction of the uterus after delivery various pathological derangements are liable

from time to time to occur. This, like every other process in the animal economy, is apt, for example, to fail either in the way of defect or excess. Some years ago I endeavored to point out to my professional brethren that occasionally, as one of the derangements in this mechanism of involution, the uterus is morbidly slow in regaining its original dimensions; its involution becomes impeded or arrested, and the organ is in consequence liable to be found, weeks or even months after parturition, still so large and unaltered as at first to be readily mistaken for a tumor of the uterus or ovary. I described this peculiar condition of the puerperal uterus under the name of 'morbid permanence of the state of puerperal hypertrophy.' . . . Retarded involution or retarded reduction of the uterus after delivery is not infrequent in its less marked degree, especially when inflammatory or febrile action supervenes and interferes with the phenomena of the puerperal state. It is often, for example, observable both during life and after death in women who are the subjects of puerperal fever, pelvic cellulitis, and phlegmasia dolens. In lesser though sufficiently marked degree it often persists for many long months, or even years, after parturition, particularly when combined, as I have frequently found it, with acute flexion or retroflexion of the fundus uteri or with the state of prolapsus." In the treatment of these cases he used "leeches and antiphlogistic measures."

In 1856 West published his *Lectures on the Diseases of Women*, and in Chapter VI., entitled "Uterine Disease from Interrupted Puerperal Changes," he says: "One result of inflammation succeeding to miscarriage or delivery is to check that process of involution by which the womb ought to be restored in a few weeks to the size and condition which it presented before pregnancy began. . . . The increased size of the uterus, too, is not due simply to its natural contractions being arrested, nor to the unnatural afflux of blood toward it, nor to the effusion of the products of inflammation into its substance, though possibly all of these causes may in various degrees contribute to it, but is in a great measure owing to the mere suppression of those changes which ought to occur after delivery, . . . and the organ remains, long after all active mischief has passed away, increased in size and at the same time composed of a tissue inapt for all the physiological processes of conception, pregnancy, and childbearing. . . . After inflammation has passed away the womb is left in such a condition as to render the repair of the damaged organ both unlikely to occur and slow to be accomplished, and it is peculiarly liable to be aggravated during the fluctuations of circulation and alternations of activity and repose to which the female sexual system is liable . . . A degree of inflammation far short of what is requisite to endanger life or to occasion much suffering may yet interpose a great obstacle to the

complete involution of the womb. . . . The great importance of this condition is due less to the symptoms to which it gives rise, so long as it remains uncomplicated, than to the circumstance that complications of some kind or other are very apt to occur; that the heavy uterus is very likely to become prolapsed, or the enlarged uterus to become the seat of permanent congestion or to be attacked by chronic inflammation. A sense of weight in the pelvis, more or less bearing down, and a disposition to excessive or over-frequent menstruation are, however, seldom absent when any considerable uterine enlargement exists, and in general the size of the womb and the severity of the symptoms are in direct proportion to each other."

He gives the history and condition of an illustrative case that is so typical of the condition under discussion and so frequently encountered by the general practitioner that we will transcribe it:

A woman, aged thirty-one years, who had been married twelve years and had given birth to five children at term and had miscarried three times. Her last abortion occurred at the third month, six weeks before her admission into the hospital. Since this abortion she had suffered from shooting pains at the lower part of the back and in the abdomen, from bearing-down pain at every effort at defecation, and from a constant sanguineous discharge by which she had been much exhausted. The medical men under whose care she had been told her that she had a tumor of the womb. On examination the uterus was found low down, completely retroverted, the os uteri being directed forward and only a short distance from the vulva. Almost immediately behind the os the uterus swelled out into a globular tumor of the size of a small apple, elastic to the touch. The canal of the cervix was open so as to admit the finger without difficulty. On introducing the uterine sound it passed, with the concavity turned backward, for a distance of five and three-quarter inches, and on turning round the tumor previously distinguished entirely disappeared. The patient was kept quiet in bed, was allowed a little wine and meat diet, and the hemorrhage ceased and the canal of the cervix contracted under the use of the ergot of rye, though no sensible uterine action was excited by the remedy.

This case was greatly benefited by the rest, tonics, and ergot, but the retroversion still existed when she was examined three months later, and the uterus was still enlarged; the treatment was continued and cold douches given. She was seen again three years later, during which time she had miscarried several times at an early period of pregnancy. "Her uterus was still retroverted, and the abortions were probably due to the organ having been turned down by adhesions in this unnatural position. It had, however, greatly diminished in size and was now little, if at all, larger than the healthy womb."

The most common causes for subinvolution are too early rising after childbirth or misarrriage, lacerations of the cervix or perineum, and septic infection resulting in the various inflammations of the pelvic contents; and to these may also be added the displacements of the

uterus due to the laxity of the supporting structures from the same condition of subinvolution in them. This condition of displacement acts more as a secondary cause, keeping up the already existing enlargement of the uterus.

Courty tells us in his splendid work on *Diseases of the Uterus* that "These sufferers attribute the unusual sensations first experienced to the weakness following labor, and wait patiently for them to disappear, but several months pass without bringing any change in their state; they commence to be astonished and disappointed not to find themselves relieved. After the child is weaned, if they had been able to nurse the child (which is unusual), they find their menses do not appear regularly or are profuse and painful. A leucorrhœa, more or less abundant, is often added to these symptoms. In the end these sufferers find themselves in a bad state of health, hard to endure. Tonics and sedatives give them some relief and make them hopeful of being cured, but the relief is incomplete. Not only does it require time to bring about a cure, but it also requires a special treatment."

In the great majority of cases of subinvolution of the uterus the patients will come to the practitioner complaining of the symptoms of the endometritis accompanying the condition and perhaps causative of it. She has backache, pelvic pains, dragging sensations about the loins, "bearing-down" pains, leucorrhœa, menstrual disorder tending to excessive flow, throbbing sensations about the uterus, general feeling of despondency, malaise, and weakness; irritability about the bladder and rectum. All these rational signs pointing to the uterus as the probable delinquent organ, a physical exploration is made and furnishes the following results: The uterus is usually discovered to be in the position of descent, retroflexion, or antelexion; it is voluminous, tender to the touch, and evidently engorged with blood; from the cervical canal a leucorrhœal matter flows; the probe carried to the fundus finds it tender and creates the flow of a little blood; the cervix is large, soft, and patulous, and in the late stages in a state of cystic degeneration.

Of the treatment of this condition Thomas writes: "I do not hesitate to declare that he who fully masters it and thoroughly appreciates its frequency and influence will possess a key to the management of numerous cases which would in vain be sought for elsewhere."

The general treatment of these cases is of the utmost importance as to such means as are used for the production of red blood being instituted; iron and tonics are invaluable combined with a liberal diet with plenty of fresh meats, easily digested; but to digest and assimilate "beef and iron" much fresh air is necessary, and this is not easily attainable by those to whom movement is irksome. We are so often given such very impracticable details of treatment for people of the less easy classes—and these make up the great mass of the ordinary

medical man's clientèle (to whom these few remarks are addressed), for his patients cannot go off on delightful jaunts like

"Mrs. Gill who is very ill,
And nothing will relieve her
But to see the Tuileries
And waddle through the Louvre!"

The people who must stay at home and care for the children and perform the usual housewifely duties, and who are not sick enough to be in bed, what are they to do? or have they no right to be sick? At best we can advise these poorer sufferers to go out at least once a day with as little fatigue as they can to themselves. I have found the time-honored prescription of drinking three glasses of warm, fresh milk every day, and, as advised by Bulkley, one hour before meals, to be a great help in restoring lost tone; also, these people can make use of the warm salt bath, which has been effective to this end in my observations.

Simpson advised counter-irritation to the abdomen and sacrum; for this he used croton oil, antimonial ointment, fly-blisters, and tincture of iodine. This was supposed to help in the absorption of the enlarged uterus, and at the same time mercurial ointment, or ointment of iodide of lead, or of bromide of potassium, and such like remedies, were applied to the vaginal portion of the uterus. Internally he used iodide or bromide of potassium for their absorptive effects, and the latter also for its calmative effect on the generative organs. To the above remedies Courty says he has added and used with advantage ergot, electricity, stimulating frictions, and sea-bathing.

A. Reeves Jackson, in vol. v. of the *Gynecological Transactions*, has a most interesting and instructive paper on the use of "Uterine Massage" in enlargement of the uterus, and gives the history of several cases in which it was entirely successful after the usual treatment had failed. He describes in his article the cases suitable for this treatment and gives the particular details of the manipulations used.

Of the internal remedies used for the treatment of subinvolution ergot is by all acknowledged as the most important and successful. Bartholow tells us "the indication for the use of ergot in menorrhagia is the existence of the large, spongy uterus—the condition of things which depends on subinvolution of the womb." In vol. xii. of the *Gynecological Transactions*, Dr. Palmer, of Cincinnati, in a paper on "The Therapeutic Value of Some Medicines in the Treatment of Hemorrhagic Conditions of the Uterus," says of ergot: "It is a remedial agent which proves curative in some cases, benefits many, but may aggravate a few. The well-proven physiological effect in stimulating contractions of the involuntary, unstriated muscular fibres, wherever found, makes this drug singularly adapted to conditions of the uterus with developed but relaxed muscular fibres, with dilated and engorged bloodvessels. Hence such pathological states of the uterus as chronic

hyperemia, of an active or passive kind, chronic metritis in its first stage, subinvolution—attended as they are by increased menstrual flux or by hemorrhage—are controlled by ergot. The more soft, flabby, relaxed, and succulent with blood the uterus is the better the good effects of ergot will be displayed.” Thomas, of New York, tells us: “During the state of enlargement—that is, before contraction of the exuberant tissue has taken place—ergot, kept up for a considerable time, produces good results. By its power of exciting contraction of the uterine tissue it diminishes hyperemia and lessens the bulk of the uterus.” Before leaving this subject we will quote, as a caution to those who may use ergot in the future, and perhaps also for the benefit of those who have not hitherto found ergot to answer their expectations in these cases, the following from Bartholow: “The numerous and diverse views which have been expressed may be in fact explained by the character of the preparations. There can be no doubt that the active constituents are unstable, and hence the pharmaceutical products vary, not only in the degree, but decidedly in the character of their actions. In Kohler’s investigations, in which he compared the ergotin of Wiggers and Bonjean, there were very wide differences between them. The ergotin of Bonjean—an aqueous extract—excites the vaso-motor centre in the medulla and the cardiac inhibitory centre, and very large doses paralyze the heart, the muscular tissue losing its excitability to galvanism. Wigger’s ergotin has no effect on the vascular apparatus. In these experiments of Kohler the power of ergot to increase the blood-pressure is an important point. The attentive reader will observe that in these experiments the heart was paralyzed and the irritability of its muscular tissue destroyed. Wigger’s ergotin causes cramps of the intestines and violent inflammation of the gastrointestinal mucous membrane—effects which never result from Bonjean’s. Both kinds of ergotin lower the temperature and both retard the respiration. Bonjean’s ergotin diminishes the irritability of the peripheral motor nerves and Wigger’s increases it. Both lessen the irritability of the sensory nerves. Kohler concludes that when it is desired to slow the heart, contract the vessels, diminish reflex actions, and lessen temperature the ergotin of Bonjean should be used.”

Subinvolution can be benefited by the frequent application of the properly selected electric current; but this is an expensive method of treatment, requiring frequent visits to the practitioner’s office and also necessitating more or less special knowledge and the possession of expensive apparatus.

That the repairing of a torn cervix or the suturing of a ruptured perineum will assist in the removal of this condition of defective involution is well established; however, we are now only having reference to such cases as refuse to consent to be “laid up” for the long time made imperative by these procedures.

What shall we do, then, for these women who come to us complaining of pelvic dragging, backache, leucorrhœa, and most of them also anæmic, with poorly performed digestion and defective chylopoëtic action generally?

First of all, let us sustain this heavy uterus which we find in the first stage of prolapsus or in the perineum, for the uterus has descended by its own weight and from the laxity of the usual supports, and the displaced organ is thus kept in a state of engorgement from its circulation being impeded by the abnormal position. In my experience this support is well given by the proper adjustment of a soft-rubber ring-pessary, and I have received the most enthusiastic acknowledgments of the patient for the comfort thus given her even before she left my consulting-room.¹

In these cases constipation is best relieved and the congested pelvic viscera benefited by sufficiently large doses of sulphate of magnesia to produce one or two watery stools each day.

Emmet tells us "that a copious flow over the vaginal surface of water varying in temperature from 100° to 110° F. is most appropriate for all cases in which congestion exists." "The injections," says he, "can be better given to the patient after she is undressed for the night and in bed. She should be placed near the edge of the bed, with the hips elevated as much as possible by the bedpan and a small pillow under her back, the lower limbs being flexed. Her body must be covered to protect her from cold and her position made perfectly comfortable; whenever the bed is a soft one, for the purpose of keeping the hips elevated a broad board should be placed under the bedpan to prevent it from sinking into the bed from the weight of the patient. The vessel of hot water is placed in a chair by the bedside. The water must be thrown in very carefully at first until the vagina has become distended." Lastly, and not the least important, the patient should be advised to support all the heavier skirts from the shoulders; and should the abdominal walls be extremely lax, as we so frequently find in multipara who have borne a large number of offspring in rapid succession, a properly fitting abdominal supporter will give relief.

"But the time has now surely come when the surgeon, whose knife is ever warm from contact with living tissue and whose pen is ever busy announcing and defeuding the claims of his work, might give a little time to those who have other life-saving means to proclaim; at least, while others are honestly discussing the value of certain surgical procedures, the busy operator may, while he pauses to wipe the perspiration from his own forehead, look back and join in the efforts to solve the problem of the real and apparent value of his doings."

¹ Thomas tells of a medical acquaintance of his who declared he never knew a case in which pessaries did good. This explained itself to Thomas later, when he discovered that his friend always introduced the pessary *upside down*.

REVIEWS.

THE TECHNIQUE OF SURGICAL GYNECOLOGY. By AUGUSTIN H. GOELLET, M.D., Professor of Gynecology in the New York School of Clinical Medicine; Consulting Professor of Gynecological Electro-therapeutics, International Correspondence Schools, Scranton, Pa. New York: International Journal of Surgery Company.

AN act and the purpose for which it is performed are two very different things, and criticism of the one may not be at all applicable to the other. Thus in the making of books it is one thing to write with a bad purpose and another to produce a good book while so doing.

In the present volume the author states in his preface that "the purpose of this work is to describe with sufficient fulness and clearness of detail the operative technique of the more common gynecological operations, that it may serve as a guide to the operator who is not thoroughly familiar with them. Unfortunately works on gynecology are lacking on this point, and many men are obliged to operate without either having assisted or witnessed them at close range." The aim of the author, therefore, is to create a short cut in gynecology, or, in other words, to substitute theoretical knowledge in place of the practical experience only to be gained by standing day after day, year in and year out, on the opposite side of the table from a man skilled in this particular line of work, who, it is to be remembered, only reached his position after years of the same drudgery. It is an alluring prospect, it flatters the vanity, but, like the mirage of the desert, it is a deception. Unfortunately useless sacrifice of human life may be the price paid by the would-be operator in learning that there is a vast difference between theoretical and practical surgery.

Of course, it is true that there are occasions when a woman far from skilled surgical aid may be in a condition demanding immediate operation, but such cases are rare, and if confronted by them it will be better that the general practitioner, unskilled in major surgical technique and without the least idea of surgical cleanliness, shall hold his hand. No book-training, no matter how closely he has applied himself to its mastery, will ever justify a man in undertaking major surgery unless the alternative of non-interference be certain death.

So much for our ideas regarding the author's aim in writing the book. Now as to the book itself. It is well written and is well worth reading. The chapters on the preparation of the patient for operation and the after-care are especially good, and the importance of surgical cleanliness is everywhere insisted upon. Conservatism in operating is also strongly emphasized, and while some of the advice given on this phase of the subject seems a little extreme there is no doubt that there is still room for earnest work along this line.

Unfortunately, however, there are some things in the book which seem out of keeping with its general excellence of tone. Much to be deplored is the statement when speaking of amputation of the cervix that the complete form of operation is "done for carcinoma which is confined to the cervix." This seems, at least tacitly, to give consent to this method of treatment of very early cases of cancer, and will certainly be considered an inexcusable statement by the majority of operators. Remembering the class of readers for whom the author is confessedly writing, it is certainly the more reprehensible in that it may, by belittling the dangerous nature of the pathological condition, deprive patients of the chance, slight though it may be, which a radical operation offers. It seems strange that in speaking of the repair of lacerations of the perineum there is no mention made of Emmet's operation, and also that so much stress is laid upon the use of silver wire in repair of the cervix. Certainly the combined experience of the great majority of operators shows that the above-mentioned operation is by far the best for the ordinary type of case, and that the use of the latter may be well discontinued in favor of other forms of suture material.

W. R. N.

THE HISTORY OF MEDICINE IN THE UNITED STATES. A Collection of Facts and Documents Relating to the History of Medical Science in this Country, from the Earliest English Colonization to the Year 1800, with a Supplemental Chapter on the Discovery of Anesthesia. By FRANCIS RANDOLPH PACKARD, M.D. Illustrated. Svo. Pp. 542. Philadelphia and London: J. B. Lippincott Co., 1901.

IN these days of progressive scientific medicine, where almost all that is useful for the practical medical man in his daily routine work is obtained by careful clinical study and painstaking laboratory research, and where all is hurry and rush toward a goal of precision that is ever alluring us onward, it is with the utmost pleasure that one is enabled by such a book as this to lay aside his duties and be allowed to delve into the history of his own past worthies and con the empirical triumphs of the medical ancestry of his country.

To accomplish such a task successfully much useless detail must be gone over, and most patient research in order to complete the defects of previous imperfect work must be made, while the broadest study of the most diverse subjects must be methodically pursued in the hope to extract some desired-for truth that might have otherwise remained hidden and unknown in its unusual situation. To the author the task of unearthing this vast amount of broadly scattered information, with the necessary exercise of patience and judgment to arrange it into a chronological and readable order, has been, as we who revere such work would desire it, "a labor of love."

The work opens with an account of the medical events connected with the early history of the English colonies in America. As the author says, although there is not much available information regarding those who practised medicine in the infancy of the general colonies, yet it is of great interest, "as those men laid the seed of future medical

progress in this country, and many of them seemed to have been possessed of much ability and medical learning, such as it was in their day."

On page 46, in speaking of the broadly accredited belief that the first autopsy in this country was performed in 1690 by one Dr. Kerf-hyle upon Governor Slaughter, he unequivocally says: "There are, however, records of four other autopsies which were held at an earlier date than the one on Governor Slaughter." Later, on page 62, the author gives a series of detailed descriptions and most convincing proofs of "The Earliest Recorded Autopsies in America," showing that the first mentioned is to be found in "An Account of Two Voyages to New England," published at London, in 1674, by John Josselyn.

The chapter on the "History of the Medical Societies Founded Before the Year 1800" is one of the most valuable in the book. In it the author states that "the first association of physicians into a society of which there is any record in America was in Boston. It existed from 1735 until at least 1741, when it disappeared in the sands of time."

On page 160 he says that "the first man to receive a medical diploma in North America was Daniel Turner, who received the gift of an honorary degree of Doctor of Medicine in 1720 from Yale College." "The first man to publish a work on a solely medical topic (page 229) was the Rev. Dr. Thomas Thacher, who was born in England." It appeared in 1677, and was entitled "Brief Rule to Guide the Common People of New England How to Order Themselves in the Small Pocks, or Measles."

The portion of the work devoted to the discovery of anæsthesia is most graphic. Attended as it was "by the bitterest and most acrimonious discussion as to who was its real discoverer," the author, after most careful study of the rival claims, makes the following terse and emphatic statement: "In my opinion the credit of first using ether as an anæsthetic is due to Crawford M Long, and the credit of demonstrating its value and use to the medical profession and the world must be ascribed to W. T. G. Morton."

Desultory perusal of many of the contained subjects soon shows a picturesqueness of style and a vividity of scene that irresistibly leads one on page by page until the special topic under consideration has been completed; while, on the other hand, methodical reading of the work, as becomes necessary to the conscientious reviewer, early makes manifest such an earnestness of purpose and so great a desire for contemporaneous proof that the reader involuntarily feels the surety of the assertions and recognizes the authority of the writer.

That its pages may ever remain with us as the best, the most certain, and the most greatly sought-for embodiment of historical research into the doings of the medical guild of our country prior to the nineteenth century—an exposition, as it were, of the early struggles of individual empiricism upon which American scientific medicine of to-day is mainly based; and that the name of the one who has offered us this account of our medical life history, and thus given us inducement to further strive, may be never forgotten among us—are the hopes and the wishes of him to whom the privilege of writing these lines has been given.

C. A. O.

THERAPEUTICS: ITS PRINCIPLES AND PRACTICE. By HORATIO C. WOOD, M.D., LL.D., Professor of Materia Medica and Therapeutics and Clinical Professor of Diseases of the Nervous System in the University of Pennsylvania. Eleventh edition. Remodelled and in greater part rewritten by HORATIO C. WOOD and HORATIO C. WOOD, JR., M.D., Demonstrator of Pharmacodynamics in the University of Pennsylvania. Philadelphia and London: J. B. Lippincott Company, 1900.

A PRACTICAL TREATISE ON MATERIA MEDICA AND THERAPEUTICS, WITH ESPECIAL REFERENCE TO THE CLINICAL APPLICATION OF DRUGS. By JOHN V. SHOEMAKER, M.D., LL.D., Professor of Materia Medica, Pharmacology, Therapeutics, and Clinical Medicine, and Clinical Professor of Diseases of the Skin in the Medico-Chirurgical College of Philadelphia; Physician to the Medico-Chirurgical Hospital. Fifth edition. Thoroughly revised. Student's edition. Philadelphia, New York, and Chicago: F. A. Davis Company, 1900.

A TEXT-BOOK OF PRACTICAL THERAPEUTICS, WITH ESPECIAL REFERENCE TO THE APPLICATION OF REMEDIAL MEASURES TO DISEASE AND THEIR EMPLOYMENT ON A RATIONAL BASIS. By HOBART AMORY HARE, M.D., B.Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia; Physician to the Jefferson Medical College Hospital. Eighth edition, enlarged, thoroughly revised, and largely rewritten. Philadelphia and New York: Lea Brothers & Co., 1900.

SOME idea of the differences of plan and scope underlying these three works on the same general subject and emanating from teachers holding chairs in three medical colleges of Philadelphia may be gathered from a consideration of their titles and sub-titles. But no one who has not had occasion to critically study and compare them side by side can appreciate from what different stand-points they are written or realize that, though so unlike the others, each one can in its way deserve the highest praise. The veteran Wood, now in its twenty-fifth year and eleventh edition, is so well known and universally used as to require but little description, although in its remodelling some radical changes have been made that deserve more than passing notice. In accordance with the progress that has been made in pharmacodynamics during the last decade whole points of view have changed and new presentations of old subjects become necessary, so that in order to maintain its authoritative position in the literature of pharmacology much recasting of the material has been required. The principal alterations consist in some condensation of the various articles both by rewriting and rearrangement in a more closely knit form, in putting into separate sections, printed in smaller type, the detailed descriptions of the results of investigation on the lower animals, and in relegating to a position at the end of the chapters the references to the literature, which are thus collected and classified in a manner convenient for reference, while at the same time the text is purified of much parenthetical writing that formerly made the page a difficult one to read.

Another feature that will be especially appreciated by students is the concise summary in bold-face type appended to the description of each drug and containing a terse account of its most important physio-

logical actions. Discussions made unnecessary by the advance of knowledge have been dropped and articles on new drugs added, so that the work remains, as it has always been, our most scientific and philosophical work on the physiological action of drugs, and the present volume is so essentially a new one that its acquisition is almost a necessity to those interested.

Shoemaker's treatise is more particularly adapted for use as a text-book, and, indeed, the author has intended it as such, since it is inscribed as a student's edition, and promise is made of a later larger volume designed for the practitioner and containing a greater range of subjects than the present one, which is devoted almost entirely to the drugs of the United States and British Pharmacopœias. For this reason the book is of especial value to the class for which it is designed, since we know of no other commentary on the Pharmacopœia from a pharmaceutical stand-point which is at the same time sufficiently extended in its treatment of drugs to supply an adequate degree of information on physiological actions and therapeutics. Too high praise cannot be given this latter section, for it is unusually rich in formulae, and the clinical index covers a most exhaustive range of topics, so that it is hard to conceive how another edition can be made more complete save by the addition of articles on the not very extensive list of important non-official drugs.

It is characteristic of the author that, although due importance is given to the work of other observers and their writings and opinions are freely quoted, every essay abounds in original observations and fresh presentations of the subject-matter. This is very strikingly so in the sections on therapeutics, which are rich in reference to the untoward or by-effects likely to be produced, individual susceptibilities to drugs and to practical points in their administration and combination with other remedies, and valuable suggestions in the treatment of disease, so as to at once stamp the author as a clinician of keen discernment as well as a widely read pharmacologist. It is worthy of note that, although three of the authors under consideration employ both the apothecaries and the metric systems, in the present volume the French measures are given the precedence.

In taking up Hare's book, after having turned the crowded pages of the other two works, the first feeling is one of doubt as to whether the ground can be covered thoroughly by such comparatively short articles. But this soon vanishes, for the perusal of one or two is sufficient to convince one of the intensely practical character of the volume. Intended for practical every-day use and written by a practical man who has known how to eliminate all the dead wood of theory and controversy and present facts and useful methods with wonderful clearness and force, the gist of many pages from scores of original monographic articles is condensed into a paragraph and the practical lesson to be deduced expressed in a single sentence, but in no case has accuracy or clearness been sacrificed to conciseness.

Four general subdivisions have been made: First, a brief consideration of general therapeutic principles, incompatibility, contraindications, etc., then the section devoted to drugs themselves, followed by another on remedial agents other than drugs, and a very useful chapter on

Foods for the Sick. The latter portion of the work is given up to short outlines of the most approved plans of treatment of the commoner diseases, arranged alphabetically for convenience of consultation, which is further enhanced by the system of cross-references.

From what has been written it is evident that no one of these books can adequately replace the others. The domain they are intended to cover is so extensive, embracing as it does practically the whole end and aim of the practice of medicine, that it is small wonder that each one may advantageously be supplemented by the other. Each of the three authors has solved the mooted question of the classification of drugs in a different way and in a manner suggestive of the trend of his book. In Wood, which is *par excellence* the reference-book and fruit of scientific years of research and laboratory work, the drugs are grouped according to their physiological action, as depresso-motors, delirifacients, etc. Shoemaker has chosen the pharmacopœial nomenclature and follows its order, laying stress on pharmaceutical points, and, by his graceful and interesting style, making what is usually a dry and difficult study especially appealing to students; while Hare, writing from the stand-point of the busy practitioner, arranges his topics alphabetically, according to their English names, and devotes particular attention to the vicissitudes of every-day practice.

S. E. J.

MENTAL AFFECTIONS: AN INTRODUCTION TO THE STUDY OF INSANITY.
Pp. 380. By JOHN MACPHERSON, M.D., F.R.C.P. Eng. London: MacMillan & Co., limited. New York: The MacMillan Company, 1899.

THE volume comprises a series of lectures, extended and rearranged, delivered by the author to students attending the class of mental diseases in the Royal Colleges' School of Medicine, Edinburgh. The modest title of this book, approaching as it does the dignity of a treatise, does not fully disclose its intrinsic value, containing, as it appears, the large clinical experience and deductions of the author derived from his connection with the asylum for the District of Stirling, Scotland, and elsewhere. It is a sidelight also on the mental equipment of a class of medical students that such a course of lectures should form a part of the curriculum of a medical college.

Nineteen chapters are divided into three parts. Part I. is devoted to a consideration of the subject of morbid heredity, by which it is to be understood that the morbid *basis* only persists and is transmitted, the neuroses being transformed in each succeeding generation, and known as dissimilar heredity, or heredity by transformation. Diathetic and nervous conditions are seldom transmitted exactly in the same form from parent to offspring. The appearance of abnormal qualities is ascribed by the author to a defective power to transmit, in part, perfectly normal characters, by which a tendency to degeneration may be corrected, and the crippled development of the spermatie and ovarian cells.

A few of the prominent causes conducive to degeneration are named as: 1. Civilization. 2. Deficient alimentation. 3. Alcohol. 4. Syphilis. 5. Tuberculosis. 6. Infections and miasmatic diseases. 7.

The arthritic diathesis. All of these causes are discussed, and their influence in the evolution of insanity and allied nervous affections is shown in connection with other active determining influences in producing insanity which the author calls social causes—as civilization, religious and political movements, education; biological causes—as age and sex; physiological causes—as nutrition, sleep and dreams, reproduction and puerperal conditions. Allusion is made to moral causes—as the influence of the emotions, and to physical causes—as environment, the seasons, heat, cold, and traumatism. Among the determining causes of insanity are included all those poisons that act upon the nervous system directly and indirectly—as intoxicants, including drugs, auto-intoxication from various sources, and from micro-organisms introduced into the system, the insanities resulting being recognized as instances of abnormal mentalization rather than the mental symptoms due to organic brain changes. The causes enumerated in hospital reports are usually divisible into those that are called moral and physical.

Much space has been given to hereditary degeneration in its relation to mental disease. While there may be a general agreement that hereditary degeneration is a most important factor, there may be some dissent from the author's views. For instance, it is stated that "insanity is not a chance occurrence like catarrh, an accident, or an attack of typhoid fever. . . . It may therefore be generally stated that in order to become a lunatic a person must inherit a vice of organization which will manifest itself in mental aberration. This vice of organization is called degeneration." We may perhaps discover in these strong assertions a consistency with the theological doctrines of election and predestination, which are said to be so stoutly held in the author's country; but, while there will remain those who will dissent from a general acquiescence in such views, they are, nevertheless, accepted by large numbers, and deserve attention when they are introduced in the course of trials, as now frequently happens, as a screen to shield a criminal from the consequences of crime. It has happened that some abnormality of the ears, the quality of the hair, an asymmetrical head, a receding chin, have been accepted as a basis to found a plea of degeneration and irresponsibility. At the date of this writing a trial is in progress in a neighboring State where the principal defence is that because of the atrocious nature of the crime, and as the parents were first cousins, the criminal must be a degenerate and therefore irresponsible. From the existence of some appearances of irregular physical development which are visible to the eye, and which may be conceded to be in the nature of degeneracy, the conclusion is reached that there must be a corresponding degree of mental and moral degeneracy that takes the criminal out of the category of responsibility, and with the same reasoning might apply as a test of testamentary capacity. While the author does not announce the extreme doctrines above, they are nevertheless held and exploited on occasions, and we desire to note that the author has devoted an unusual space to the discussion of degeneracy in its relation to insanity.

Part II. is mainly devoted to the consideration of the physical and mental stigmata of degeneration, and, including Part I., comprises one-third of the volume. The remaining chapters are devoted to *Clinical Symptomatology*, or the clinical symptoms of various mental affections,

beginning with mania, melancholia, etc. The author discloses his individuality in following a well-understood nomenclature, and has not clouded his meaning by the use of terms which might require a too frequent reference to a classical dictionary. If in a critical mood, we might ask why the consideration of mania should precede that of melancholia, as the former is so frequently but an evolution from the latter, and we might further add that too little stress is laid upon those neurasthenic conditions that foreshadow so many insanities. In addition to a discussion of several well-recognized forms of mental affection, there are three chapters devoted to the clinical study of toxic insanity and confusional insanity arising from physical exhaustion, nervous shock, or malnutrition, the delirium of collapse, puerperal and other insanities of infective origin, acute delirious mania, microbial toxins, confusional states arising from alcohol and excessive use of drugs, all of which have been studied and recognized more clearly in recent years, and now must have a distinct place. Other chapters are devoted to the insanity of the degenerate, moral insanity, insanity in connection with the neuroses and from organic brain disease. All of these mental affections should have a proper place in the lecture-room. The author has ably and well treated every topic he has considered, has honestly given out the best of his experiences, free from professional dogmatism, and the book will have a foremost place among those of recent years devoted to the consideration of mental affections.

J. B. C.

ATLAS AND EPITOME OF DISEASES CAUSED BY ACCIDENTS. By DR. ED. GOLEBIEWSKI, of Berlin. Translated from the German by PEARCE BAILEY, M.D. Philadelphia: W. B. Saunders & Co., 1900.

THIS book might well be called the prognosis of accidents. There is presented in this volume a systematic description of the sequel of injuries caused by accidents. The book is divided into two parts, one treating of injuries in general, the other of injuries affecting special structures and regions of the body.

The symptomatology of the sequels of the various forms of injury date usually from the termination of both medical and surgical treatment.

The book is based upon an experience of thirteen years with accident cases, or about 5245 cases, many of which have been followed long enough to know the final result. Germany in 1884 passed a law insuring workmen against injury. Under the German method any factor except the extent of the injury is fixed and uniform. In the United States nothing is fixed except the principles of the law in the judge's charge to the jury.

According to the German law the insurance allowance may be diminished or increased according as the injured person gets better or worse with time. It does away with the question of exaggeration.

This law in Germany has been a stimulus to medical men to become familiar as experts with the results of traumatism to the body.

The introduction to the American edition is splendidly written, and is full of suggestions.

The end-results of many fracture cases are carefully recorded. The general results following fractures of different regions are summarized.

The average student in graduating from any of our first-rate medical schools has been so occupied during his student days with the details of his medical and surgical work, that he has little time to devote to *prognosis*—he sees patients in the various clinics, but he only exceptionally sees them later. This is particularly true of cases of fracture. Here the prognosis is important. A knowledge of the results of fracture is of very great importance. Few hospital surgeons have a definite notion of these after-results.

In this volume are collected the end-results of the author's many cases of fracture of the bones of the body. The statements may be taken as representing approximately the experience of American surgeons. This book represents the result of an enormous and painstaking industry on the part of the author. It is a pioneer in traumatic surgery, and will repay one for a careful study. The book is profusely illustrated.

If this volume shall stimulate surgeons in this country to a more accurate observation, and a more prolonged observation of their cases in all departments, it will have served a most useful purpose.

Very many medico-legal opinions have little basis in solid facts; the opinions are not well founded, for the very reason that the expert has often little recorded or personal experience upon which to put a judgment. This volume will assist many medico-legal experts who deal with traumatism.

C. L. S.

MANUAL OF DISEASES OF THE EYE. By CHARLES H. MAY, M.D. With 243 original illustrations, including twelve colored figures.

Is the rapid multiplication of text-books it has become necessary to attempt a classification of them according to their contents and the place in medicine which they are supposed to fill. Thus, the name of *quiz compend* has been given to the work of humblest aspirations; *manual* to that of next greater pretension. By *text-book* is usually understood a volume which contains such a complete exposition of the subject of which it treats that the student is enabled to gain a thorough knowledge of it from a study of its pages, while the dignity of the name of *system* is reserved for more comprehensive books, generally of a composite nature, the product of the pen of different authors who are supposed to be particularly fitted to elucidate the subjects assigned to them.

The value of the first two of these, of the *quiz compend* and of the *manual*, has ever been doubtful in the mind of the reviewer, as he questions very strongly whether the study of such jogs to memory—for they are but little more—can ever be of lasting good to the reader. These books are particularly recommended by their authors to students and general practitioners—to those, in other words, who are quite unfamiliar with the subject. It would seem that these classes of readers need a book that is not so much concise as it is explanatory, so that in place of these elementary treatises it is the custom of the reviewer to recommend a text-book, of which there are so many admirable examples, to all beginners in ophthalmology.

Dr. May, however, has written a most excellent little book—the best of its class, perhaps—and to those in search of a manual it may be frankly recommended. The arrangement of the subject-matter is excellent, its style easy, and the text gives evidence of having been carefully prepared.

W. C. P.

A TREATISE ON APPENDICITIS. By JOHN B. DEEVER, M.D., Surgeon-in-Chief to the German Hospital, Philadelphia. Second edition, thoroughly revised and considerably enlarged. Illustrated with 22 full-page plates. Octavo. Philadelphia: P. Blakiston's Son & Co.

THE chapter on the Pathology of Appendicitis is a most clear statement of the conditions existing. The plates illustrate so well that they add greatly to the descriptive text. This volume is a splendid guide to the practitioner. Only superlative praise can be properly given of the book.

The symptomatology is grouped about the two great clinical classes of cases—the acute and the chronic. This grouping simplifies one's conception of a disease having such a variety of pathological lesions.

The chapter dealing with differential diagnosis is satisfactory in that all the lesions most likely to be confused with an appendicitis are carefully considered.

The chapter on Treatment discusses the many phases of the subject. No practitioner has a right to advise his patient upon the matter of treatment without the advice of a surgeon who is skilled in the care of appendicitis cases.

Dr. Deaver takes the ground that as soon as the diagnosis of appendicitis is made operation should be done at the earliest convenient opportunity. This is safe advice. There are but few conditions which will justify the delay of operative treatment.

He also thinks that operation is contraindicated in those cases of diffuse peritonitis with distended abdomen, high temperature, rapid pulse, anxious expression, continuous vomiting, and diffused tenderness.

We believe that this desperate class of cases is to be dealt with according to the peculiarities of the individual case. We have seen cases which might properly be grouped in Dr. Deaver's "contraindicated" class operated upon and recover. On the other hand, Dr. Deaver says some such cases unoperated and treated medically have in his experience recovered. These cases cannot be treated as a class. We are of the opinion that many of the desperate cases of general peritonitis have recovered because they were operated upon. We are likewise of the opinion that with very few exceptions these desperate cases are far safer after a rapid operation for cleansing and drainage than from expectant and medical treatment. The moribund cases, of course, should not be operated. The desperate cases that are not moribund, however, should be given the benefit of an operation.

Every practitioner and surgeon should own and read and reread the chapter in this book on the Pathology of Appendicitis; it is wisely written.

C. L. S.

PROGRESS OF MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Intestinal Perforation in Typhoid Fever.—W. OSLER (*Philadelphia Medical Journal*, January 19, 1901), in discussing perforation and perforative peritonitis in typhoid fever, directs attention to the fact that a very large proportion of the cases of perforation show conditions which are not at all characteristic, according to the general description of this condition. He believes that with proper diagnosis surgical intervention would greatly reduce the mortality from perforation, and perhaps about half the cases could be saved. The great trouble is that we know too little about the diagnosis of perforation. His recommendations are that in cases in which the occurrence of perforation is suspected a skilled diagnostician should be, if possible, in constant attendance so that the diagnosis may be made as early as possible, and if perforation occurs surgical intervention should be undertaken at once. The accident is likely to occur during the more severe cases and during the height of the disease. It occurs more frequently in cases showing diarrhoea and tympanites; of 30 cases observed at Johns Hopkins Hospital 20 had diarrhoea and 6 had both perforation and hemorrhage. If marked abdominal symptoms appear perforation should be watched for constantly. He recommends that one should be always on the alert for any distinct abdominal pain, particularly when it shows severe onset and is intense and tends to grow worse; it should be especially determined whether the pain is diffuse or localized toward the lower right side of the abdomen. One should also note whether the abdomen is flat, scaphoid, or distended, particularly whether it is uniformly distended, whether respiratory movements are present over the abdomen, and whether they are uniform and seen both above and below the navel. One should note tension and pain on palpation, muscular rigidity, and spasm, particularly in the epigastric region and right iliac fossa, and whether spasm is found by rectal

examination. The liver dulness should also be watched in the middle, nipple, and mid-axillary lines; auscultatory percussion may be an aid in this. Any tenderness or fulcness discovered by rectal examination is important. Blood and sloughs should be looked for in the stools and any change in their character noted. As to the general condition of the patient, any change in expression should be noted, together with increase in the rapidity of the pulse, decided change in the temperature, sudden increase in the respirations, or a shallowness or sighing character of the respiration. The occurrence of sweats, of vomiting, and of hiccough may be important, and one should also look for a change in the leucocyte count, having in mind that there is an almost constant leucopæmia in typhoid fever. He describes in detail three cases in which, in the absence of typical symptoms, a diagnosis of perforation was made and operation performed. The first patient died, apparently chiefly from the effects of the disease itself. In the second case death occurred on the table. In this instance the walls of the gut were so swollen and infiltrated that sutures would not hold in the neighborhood of the perforation. In the third case complete recovery occurred. As to the general results of operation in the Johns Hopkins Hospital, Osler mentions one series of 11 cases in which 5 recoveries occurred. In all 16 cases have been operated upon, with 6 recoveries, a percentage of 37.5.

Disinfection of Typhoidal Excreta.—N. B. GWYN (*Philadelphia Medical Journal*, January 12, 1901), after insisting upon the importance of infected typhoidal urine in the dissemination of typhoid fever, reports his results in studying the effects of various antiseptics upon urine containing typhoid bacilli. In conclusion, he states that milk of lime is not deserving of the name of disinfectant. Carbolic acid is useful only in large amounts and in strong solution if a rapid action is desired. Formalin is efficient, but very expensive for ordinary use. Bichloride of mercury, chlorinated lime, and liquid chlorides are very valuable, are rapid in action, and are efficient in comparatively dilute solutions. For disinfection within five minutes he states that of a 1:20 carbolic-acid solution one needs half the volume of the urine to be disinfected; of a 1:40 carbolic-acid solution one should use two-thirds of the volume of urine to be disinfected; while of a 1:1000 bichloride of mercury only one-fifth the volume of urine is necessary; of a 10 per cent. formalin solution, three-tenths the volume of urine should be used; of saturated chlorinated lime one-fortieth the volume of urine, and of liquid chlorides two-fifths the volume of urine. He states that the disinfection seemed to be quite as rapid in urines containing albumin as in those free from albumin. For irrigation of the bladder he states that solutions of bichloride in strengths of 1:100,000 to 1:50,000 are most successful. He considers urotropin the only substance which produces any effect when given by the mouth.

Auto-intoxication.—H. STRAUSS and H. PHILIPPSON (*Zeitschrift für klin. Med.*, Band xl., p. 369) discuss the excretion of enterogenous decomposition products in the urine under constant diet and insist upon the importance of constant diet in similar studies. Their researches were carried out

by using a test diet, which they describe. They estimated quantitatively the amount of volatile fatty acids and ethereal sulphates in the urine and made qualitative estimations of the phenol and indican. About 100 results are reported; some of these were obtained in persons who had gastro-intestinal affections, others in patients who had no such disturbance. The normal value for volatile fatty acids in the urine was accepted as between 40 and 80. Alimentary factors were found to have no constant influence upon the excretion of the volatile fatty acids, even diarrhea having no pronounced influence. Constipation did, however, have a notable effect upon their amount, as well as upon the aromatic oxyacids, the ethereal sulphates, the phenol, and the indican. Changes in the gastric secretion had no notable influence upon the excretion products with the exception of the ethereal sulphates. There was a general tendency to decrease of the ethereal sulphates with hyperacidity and increase with hypacidity or amacidity. This influence was, however, not at all constant. A very marked increase in the putrefaction products was seen in two cases of disease of the liver. The most important statement which the authors make is that their results lead them to conclude there is excellent evidence that the amount of putrefaction products in the urine varies much more markedly according to the conditions of the tissues in general than in accordance with the condition of the gastro-intestinal tract; in other words, that with normal conditions of the gastro-intestinal tract or with imperfect tissue action the products of putrefaction found in the urine are much increased, while with normal tissues the products in the urine remain normal, often even when there is marked increase in the production in the intestine. They decide from this that, as a rule, when they are increased one is far better justified in speaking of "tissue intoxication" than of "gastro-intestinal intoxication," though both may be present. Finally, in discussing some observations concerning the excretion of acetone, they state that a marked increase in the fatty acids in the intestinal contents seems to increase the acetone excretion.

Post-hemorrhagic Hæmoglobinuria.—MICHAELIS (*Deutsch. med. Woch.*, 1901, xxvii., 51) reports the case of a woman who had a sudden, very extensive intra-abdominal hemorrhage from a ruptured tubal pregnancy. On the day after the hemorrhage the examination of the blood showed but 25 per cent. of hæmoglobin, and a few nucleated red blood-corpuscles. The urine, which was examined for the first time the day after the hemorrhage, was of a dark, reddish-black color, and contained a trace of albumin and abundant blood-coloring matter. The centrifugalized sediment showed a few short granular casts and hardly a single red blood-corpuscle. On the following day the hæmoglobin had increased in quantity, but a day later it had entirely cleared up. The patient made a gradual recovery, but, on the fifth day after the disappearance of the hæmoglobinuria, there were slight chilly sensations, a sudden rise of temperature to 38.6° and a fresh attack of hæmoglobinuria which lasted four days.

According to Michaelis, these attacks, occurring during the absorption of a large intra-abdominal hemorrhage, may be accounted for either by the assumption of the absorption of the coloring matter directly into the blood and its excretion by the kidneys, or by the formation of a hæmolysin, which,

acting upon the blood-corpuscles of the patient, produced the hæmoglobinæmia and hæmoglobinuria.

The first possibility seems scarcely probable inasmuch as no such instance has ever been noted, urobilin alone having been found in the urine in such cases. The other possibility, however, is extremely interesting in connection with the observations of Bordet and Ehrlich and Morgenroth. These observers have shown that after continued injections of blood of an animal of one species into that of another, the serum of the animal inoculated acquires the power of dissolving the blood-corpuscles of the other animal. This power is lost by heating to a temperature of 55° , but is acquired again if a little normal serum be added. From many researches Ehrlich and Morgenroth came to the following theoretical explanation of these facts.

The actual blood-dissolving principle is present in normal serum, but fails to exercise its power because it is unable to unite with the molecules of the red blood-corpuscles. The serum of an animal which has received injections of blood differs from normal serum in that it contains a body which, on the one hand, unites with the molecules of the red blood-corpuscles, and, on the other hand, with this dissolving principle, which is present in normal serum, thus favoring the action of the latter upon the red blood-corpuscles. Ehrlich speaks of this specific body, present only in blood which has been treated by this method, as the *immune body*, the other as the *addiment*. The first he calls the *intermediate link*, the latter the *final link*. The *final link* is so unstable that it is rapidly destroyed at a temperature of 55° , while the *intermediate link* is more resistant. If, then, one heat to 55° C. the serum of an animal which has been previously treated with injections of blood the *final link* is destroyed, and the serum is thus deprived of its blood-dissolving property. But since the *final link* is present in every normal serum, the addition of a little such brings back again the blood-dissolving properties.

The origin of the *intermediate link* Ehrlich accounts for, according to his antitoxin theory, in the following manner: The molecules of the sheep's blood-corpuscles may contain special chains of atoms which may be indicated by the sign $+a$. In certain cells of the organism of the goat there are found chains of atoms which have the property of uniting with this $+a$ group. This corresponding group may be indicated by the sign $-a$. If, then, sheep's blood be injected into a goat all the $+a$ groups will unite with the corresponding $-a$ groups; but inasmuch as the $-a$ groups must have some physiological importance in the organism of the goat, the goat would of necessity suffer if these groups, which are now put out of function, were not regenerated. Therefore, the organism of the goat produces an abundance of fresh groups of $-a$ atoms, and, indeed, according to Weigert's law, in a quantity far above that actually called for by the organism. The result is that the excess of the $-a$ atom groups are cast off from the mother molecule and accumulate in the blood, forming thus the specific *intermediate link*.

Lately Ehrlich and Morgenroth have called attention to the fact that this *intermediate link* arises not only when the blood of an animal of one species is injected into that of another, but that a hæmolyisin is obtained when one injects the blood of one goat into the blood of another. Such hæmolyisins they have termed *isolyisins*.

The question which now naturally arises is: Why if one injects into an animal his own blood, or if an animal absorbs rapidly an extensive extravasation, does there not arise an *autolysin*—that is, a hemolysin which destroys its own blood-corpuscles?

One might further ask why there is not always an *autolysin* present in the blood, if, as must be the case, the blood always contains corpuscles possessing the \div -a groups of atoms. This latter question is easily answered, for the \div -a groups are not free in the blood, but are bound to the red blood-corpuscles and are, therefore, unable to unite with the \div -a groups wherever they may be present. For this to occur the \div -a groups of atoms must be present in the blood in solution, as they would be in the absorption of an extravasation. Why, then, does not an *autolysin* arise during the absorption of an extravasation? This Ehrlich explains in an interesting manner. With the absorption of an extravasation a number of molecules which possess the \div -a groups of atoms enter the blood and will immediately seek out in the organism the \div -a groups in excess and unite with them. But this is a stimulus for the organism to produce \div -a groups in excess and to cast them off. So that free \div -a groups, in other words, an *autolysin*, should escape into the circulation. But since there is no reason to assume that the \div -a groups are only found in the blood and not also in other organs, this *autolysin* (the \div -a groups) is bound not only to the blood-corpuscles but to all other cells which possess the \div -a groups of atoms. As a result of this, again, an excess of \div -a groups are produced and cast off, and these escaping in a free state into the blood constitute an *anti-autolysin*. In other words, the appearance of a small quantity of *autolysin* would constitute a stimulus for the organism to produce immediately an *anti-autolysin*. But if this idea be correct one might still expect sometimes to see evidences of the formation of an *autolysin*; this might, for instance, occur when the absorption of a large extravasation of blood occurs so quickly that the organism has not sufficient time to form a proper quantity of *anti-autolysin*. The authors, nevertheless, had never been able to observe a case of this sort. Michaelis, however, points in an extremely interesting manner to the possibility that this case, in which there occurred extraordinarily severe hemorrhage which was absorbed very rapidly and followed by hemoglobinuria, *very probably constitutes exactly such an instance*. Ehrlich's hypothesis is, of course, unproven, but the author points out that it is the most satisfactory hypothesis for the explanation of immunity and the development of lysins which has yet been advanced.

Concerning the Antiphlogistic Action of Cold Applied to Points Distant from the Seat of Inflammation.—EMMER (Fortsehrille der Medicin, 1901, xix., p. 161), in Goldscheider's clinic, has repeated some experiments which were made by Samuel in 1892, with regard to the antiphlogistic action of cold applied at points distant from the seat of inflammation. Samuel noted that if croton oil were applied to one ear of the rabbit, while the other was immersed in water, the inflammation was materially delayed. In control rabbits the process came on in five hours, while in those in which the opposite ear was immersed, no signs of inflammation were to be noted throughout the experiments, which lasted up to twelve hours. On removing the ear from the water, however, the inflammation began. Samuel's explanation

of this antiphlogistic action was that, owing to cooling of an extensive vascular area, the leucocytes which passed through the vessels were, for a certain length of time, deprived of their active motility. In repeating Samuel's experiments Emmert adopted a somewhat different plan, as he found it difficult to keep the rabbit's ear under water for long periods of time without bringing about conditions which interfered with the experiment. An arrangement was made by which, without much distress to the animal, one leg could be kept under water. It was found that under normal circumstances the time at which the evidences of inflammation set in varied so greatly that it was necessary to retain the leg under water for at least twelve hours, by which time, in the control animals, the inflammation invariably came on. The experiments showed that, by immersion of the lower half of the left hind leg in water at a temperature of from 12° to 15° C., the croton oil inflammation was delayed as long as the leg remained in water. Some of the experiments were continued as long as thirty hours. Another series of experiments, in which the leg was immersed after the inflammation had begun, showed distinctly that the inflammatory process stopped at the point which it had reached at the beginning of the bath.

With regard to the explanation of this phenomenon, Emmert differs from Samuel. He noted, contrary to the observations of the latter, that the temperature of the animal always fell several degrees, and that this fall in temperature always preceded the disappearance of the inflammatory process. It was found, further, that if, while the leg was still in the bath, the animal was warmed so as to prevent this fall of temperature, the inflammation occurred exactly as in the control animals. In another animal exposed simply to cold air there was also a marked fall of temperature and a material delay in the onset of the inflammation. He concludes that the observation of Samuel that the immersion of one extremity of a rabbit in a cool fluid is sufficient to hinder the development of a croton oil inflammation in another part, is true; that, indeed, the antiphlogistic action of this procedure is even greater than Samuel suspected. Emmert's experiments, however, appear to show that the delay and prevention of the croton oil inflammation depends not upon any special action of the cold on the leucocytes in the exposed area, but upon the marked fall of temperature throughout the whole animal's body. Unfortunately, the practical application of the procedure in man is not possible, experiments by Leube and others having shown that the local application of cold in human beings produces relatively a much less fall of temperature than in animals.

Generalized Tic Convulsif Cured by Respiratory Gymnastics—PITRES (*Journal de Médecine de Bordeaux*, 1901, xxx., p. 106) presented to the Medical and Surgical Society of Bordeaux, on February 2, 1900, a young man, aged twenty years, who had suffered for eleven years from a convulsive tic of unusual intensity. Every six or eight seconds the patient had violent spasms as rapid as if they had been provoked by electrical discharges, which resulted in quick, sharp movements of his head, trunk, or extremities, accompanied by a sudden expulsion of involuntary cries or inarticulate groans. The health of the patient was good. He was able to eat and sleep, but the movements interfered with his work and resulted in

his avoiding others for fear of ridicule. It was noted that when the patient sang or counted at the top of his voice, or when he took deep, regular, rhythmical inspirations, the attacks diminished considerably in frequency, and it occurred to Pitres that they might be influenced by gymnastic respiratory exercises analogous to those which are commonly employed in the treatment of stuttering. Pitres has recently applied similar methods with success in the treatment of certain more simple ties. Three or four times a day, for ten minutes, the patient was placed with his back against a wall, and was advised to take as slow and deep respirations as possible, raising his arms during inspiration and allowing them to fall during expiration. From the beginning the attacks became less frequent. A month later the amelioration was very evident. At this time the patient had to return to his home. He continued the exercises, however, regularly, and in three months the attacks had become rare. Nine months after treatment none whatever were present, the patient was at work and was apparently entirely cured.

[This case is particularly remarkable in that so good a result appears to have been attained in a tic of so long duration.—W. S. T.]

The Freezing Point of the Blood in Typhoid Fever.—RUMPEL (*Münchener med. Wochenschrift*, 1901, xlviii., p. 223).

In the *Deutsche medicinische Wochenschrift*, 1900, No. 46, Waldvogel published some observations tending to show that the freezing point of the blood in typhoid fever differed materially from that observed under normal conditions. Rumpel, who had already made some observations upon a similar subject in an article which is shortly to appear, being inclined to doubt the methods of Waldvogel, repeated the experiments. Waldvogel's observations showed a remarkable increase in the osmotic tension of the blood in typhoid fever, which resulted in the falling of the freezing point to -1.68° C. The results were striking in that the blood concentration in an osmotic sense is very constant, the freezing point varying, according to Rumpel's observations, extremely little—from -0.55° to -0.57° C. Waldvogel, in his observations, used the blood serum of typhoid patients which had been taken for the Widal reaction, the blood having twice remained twenty-four hours upon ice. As the quantity of the serum which was used was too small for the determination of the freezing point, it was diluted several times with distilled water. Instead of the ordinary glass cylinder of Beckmann's apparatus a wide test-tube was used, and in place of the mixer the thermometer itself. Apart from the various sources of error which must be connected with this method of procedure, Rumpel saw in it no great simplification of the ordinary method; and in his observations he took 15 cm. of blood directly from the vein, introducing it immediately into the cylinder, and making the estimation immediately after defibrinating the blood, by stirring with a platinum ring. By making comparative tests according to his own method and that of Waldvogel, he was able to demonstrate the many sources of error in the former. He then made estimates of the freezing point of the blood in eleven cases of typhoid fever which were at that time in the hospital. The examinations were made at various different stages of the disease. In all instances these showed an entirely normal blood concentration in an osmotic sense—that is, the freezing point varied between -0.56° and -0.57° .

The author observes that, owing to the few investigations, one is not justified in assuming that the osmotic tension of the blood in typhoid fever is always normal, but that, in comparison to Waldvogel's twenty-two cases, his eleven, in which the examination was made in a more careful manner, showed no abnormal deviation of the freezing point.

SURGERY.

UNDER THE CHARGE OF

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Compression of the Pedicle of a Movable Kidney by a Distended Gall-bladder Containing Calculi.—REYMOND (*Revue de Chirurgie*, June 10, 1900) states that it is not always possible to diagnose between these two conditions, and the diagnosis of the case becomes especially difficult when the two conditions coexist, as is well shown in the author's case, which was that of a woman, aged thirty-eight years, married, had five children, and one tubal pregnancy, the latter requiring operative interference for its relief. Eight days previous to her admission to the hospital violent exertion was followed by severe pain in the right flank; this was so severe as to make her keep in bed. Examination showed an irregular pulse, fever, pinched facies, but no trace of jaundice. Vomiting was persistent on attempting to take nourishment. The urine was normal. The patient complained of being always in pain, which at times became more acute; it was felt in the hypochondrium and right flank; some pain was felt along the course of the ureter, while at times it ascended to the right shoulder. The abdomen was distended, and so sensitive on palpation as to make an examination most difficult. On palpation a hard, irregular tumor, situated somewhat deeply, was noted in the region of the gall-bladder. There was marked dulness on percussion, and further examination enabled one to limit this tumor. It descended to two fingers' breadth below a horizontal line passing through the umbilicus; to the inner side it extended to the median line, while to the outer side its limits were less precise. The tumor had a pear-shape, and moved during respiration. Beyond the limits of this tumor was a second mass of more homogeneous consistence, situated backward below and to the outer side of the first tumor, and having the form of an enlarged kidney. These two masses could not be separately moved; they gave the impression of a bilobar tumor and not that of two separate and distinct tumors.

Operation. An incision was made in the loin over the tumor. On exposing the tumor it was found to consist of an hydronephrotic movable kidney and an enlarged gall-bladder. The kidney was secured in place in the usual manner, and the wound closed temporarily. Seven days later a cholecystotomy was performed, and sixty grammes of pus and four calculi were removed. The gall-bladder was sewed in the wound, and three weeks later the wound was closed and the patient made an uninterrupted recovery. Bacteriological examination showed the presence of the colon bacillus. The symptoms in this case pointed to the gall-bladder and also to the kidney. It is important to know if these two conditions are coincident or if one is produced by the other. According to Potain, the gall-bladder is the one primarily affected, while Roux claims that the displacement of the kidney is primary. It exercises traction on the cystic duct by the medium of the right border of the hepatoduodenal ligament, and thereby obstructs the course of the bile and favors the formation of calculi. Each of these hypotheses is more or less true, but it still remains to be shown definitely which one is right.

On Gonorrhœal Rheumatism.—LORIMER (*The Quarterly Medical Journal*, November, 1900) states the following conclusions: (1) That the different descriptions of gonorrhœal arthritis depend on the fact that a uniform type of ordinary rheumatism has not been taken as a standard of comparison and contrast, and, therefore, many of the alleged differences are not essential distinctions, but are simply dependent on the degree of pyrexia. (2) That, excluding cases of ordinary acute rheumatism occurring during gonorrhœa, there are three distinct forms of gonorrhœal arthritis: (a) The rheumatic form, in which the disease is at first identical with acute rheumatism, but as it proceeds the pyrexia becomes subacute, the migratory arthritis ceases and becomes fixed in one or two joints, where it runs a tedious and protracted course. It is in this form that cardiac complications may appear and that the analogies with ordinary rheumatism are more apparent. (b) The subacute type, or true gonorrhœal arthritis, constitutes the largest proportion of cases. Cardiac complications are seldom present; there is absence of acid perspiration, a stationary type of arthritis, a liability to chronic articular changes, sometimes suppuration, and marked muscular atrophy. (c) The chronic asthenic type, frequently monoarticular in serofulous subjects, with hydrarthrosis and frequently effusion of seropurulent fluid. (3) That scarlatinal rheumatism and gonorrhœal rheumatism have certain distinctions in common, such as rarity of cardiac complications and liability to suppuration; but, on the other hand, the fugitive character of the former contrasts with the persistent character of the latter. (4) That in regard to chronic articular changes, gonorrhœal arthritis occupies an intermediate place between ordinary rheumatism and arthritis deformans; for on the one hand, though the joints do not quickly return to their natural condition, they hardly ever proceed to further distinctive changes.

Of the hypotheses which have been propounded to explain gonorrhœal arthritis the two chief are: (a) The neuropathic, which ascribes the arthritis to inflammatory irritation gradually propagated from the urethra to the sacral plexus and spinal cord, where it affects the trophic centres of the joints.

This hypothesis came into fashion with Chareot's description of arthropathies in locomotor ataxia. (1) But the articular lesions in ataxy and syringomyelia are different in character from those of gonorrhœal arthritis. (2) It has to explain why the degree of irritation is in no way related to the articular and general symptoms; why new joints become affected while the irritation is subsiding, and why, in the most violent cases of urethral irritation, gonorrhœal rheumatism is rarely observed. (3) Moreover, it does not explain the articular phenomena of the disease. (4) It fails to explain those cases of arthritis following ophthalmia neonatorum without urethritis. (5) The toxæmic, viz., that the arthritis is due to the dissemination of a specific micro-organism—the gonococcus—a hypothesis which is believed to offer a better explanation of the phenomena of the disease, but which, however, is still *sub judice*.

Intraspinal Cocainization from the Anæsthetist's Stand-point.—GOLDAN (*New York Medical Journal*, December 22, 1900) states that the possibility of extending the use of the method by making the injection into the cervical portion of the canal has recently been advocated and based upon the researches of Tait and Caglieri, who base their observations on three cases. In the first two cases 0.5 and 1 c.cm. respectively of a 1.5 per cent. solution of cocaine were used and produced anæsthesia in eight and five minutes respectively. In the third case, in which 3 c.cm. of a 0.5 per cent. solution were used, no anæsthesia was obtained after the lapse of one hour and twenty-eight minutes. This patient complained of cephalalgia, intense heat over the entire body, copious perspiration, and slight vomiting. The following day slight headache and weakness in the legs ensued. While it is true that the puncture of nerve trunks by a needle is harmless, the author fails to find any authority for saying that the puncture of the spinal cord is or may be harmless. We know that the cord averages but 1 cm. in diameter; to use the spinal puncture and injection in the cervical region, or any other above the second lumbar vertebra, means the introduction of a needle not only into the subarachnoid space but often the cord as well. Now, such a needle, no matter how fine, must do one of two things: it must either sever the fibres or push them aside, and as some of the columns of the cord are probably no longer than the needle itself, severing them would always have to be considered as a possibility. The cord tissue once severed, we are taught, never regenerates, and here the possibility of remote complications, such as ascending or descending degeneration, comes in.

It has been said that in those cases in which, for any reason, a general anæsthetic must be administered where the spinal puncture and injection have been performed it is surprising how quickly these patients are anæsthetized and subsequently regain consciousness. In the first place, these patients cannot be anæsthetized more rapidly than if they at first had not had cocaine, nor is consciousness more quickly regained or the quantity of the anæsthetic lessened. We must be fair and not accept as true that which is only apparently but not actually so. Is there any reason why a patient who has had an operation half-finished with cocaine, and in whom chloroform or ether has then been substituted, should have used more than half the quantity that he otherwise would? Is it not a fact, which all must admit

who have used the spinal method, that these patients are shocked? and, further, is it not true that patients in a condition of shock require lesser quantities of anesthetics than those in whom shock is absent? To say that patients do not suffer from shock at all comparable with that from general anesthesia is absolutely untrue. Only those who have seen patients in whom the lumbar puncture and injection have been performed, showing the extremely rapid and small pulse, from 120 to 150 a minute, and at times suddenly falling to half that rate and becoming full; the rapid and shallow respiration, the ashy-gray pallor, the at times slightly cyanosed condition of the skin, finger-tips, and mucous membranes; and the profuse perspiration, can say whether this is true. If this is not shock, what is it? And it is a shock so great in its intensity that it can be compared only with very profound chloroformization; it is a condition of which one experience is quite sufficient; and these symptoms have occurred in the experience of those who have used the method extensively, with so small a quantity in some cases as 1 c.cm. of a 2 per cent. solution (one-sixth of a grain of cocaine). From the stand-point of time-saving, of preservation of consciousness, or of convenience this method cannot commend itself in the vast majority of instances to either the patient or the surgeon in preference to general anesthesia by either nitrous oxide, ether, or chloroform, properly selected and skilfully administered. It has been said that the method might be useful in cardiac, pulmonary, and renal diseases where a general anesthetic is indicated. As the patients in whom the spinal anesthesia has been employed often manifested at first an extremely small and rapid pulse, which was at times suddenly followed by a full, very slow pulse, it does not seem to the author to be compatible with safety, particularly in cardiac or pulmonary disease where there is any tendency to venous congestion. That one of Tuffier's patients died of asphyxia, and upon autopsy a pulmonary thrombus was found, can easily be explained by this marked circulatory depression. In renal disease the method may be of value in preference to a general anesthetic. It has not, however, been shown as yet that even in such a case cocaine itself might not prove deleterious. The author has had such a case of renal disease where the surgeon considered a general anesthetic contraindicated; spinal anesthesia was attempted, and after two punctures and injections aggregating half a grain of cocaine, anesthesia failed to be induced and chloroform was administered, with no untoward results during or after the anesthesia. There are few patients requiring surgical interference that cannot take one of three general anesthetics if properly selected.

Exclusion of the Intestine.—TERRIER and GOSSET (*Revue de Chirurgie*, December 10, 1900), after reviewing in detail a series of fifty-two cases, state, in conclusion, that at this time there is nothing to be gained by discussing the value of the operation of excision with total occlusion of the part excluded, for the reason that all surgeons agree in rejecting this method of treatment. In the case of fecal fistula or of tuberculosis of the intestines the operation that should be given the preference is that of exclusion with partial occlusion of the part excluded. The future shall determine if the operation of choice for cases of inextirpable cancer of the intestines is

unilateral exclusion and if the flowing back of the intestinal contents into the portion excluded is really to be feared.

A Fatal Case of Cocainization of the Spinal Cord.—GOILAV (*Bull. et Mem. de la Soc. de Chir. de Bucharest*, May 3, 1900) reports the case of a man, aged sixty-seven years, whose leg he amputated at the site of election under spinal anæsthesia. After withdrawing about one gramme of cerebro-spinal fluid an injection of 1.5 centigrammes of a 1 per cent. solution of cocaine was made between the fourth and fifth lumbar vertebrae. Anæsthesia was complete in fifteen minutes and was perfect throughout the operation. During the operation the patient complained of headache, for the relief of which one-half gramme of antipyrine was administered, with but slight effect. He was also given coffee, but the result was negative. The operation lasted forty minutes and then the patient was placed in bed between hot-water bottles. Two hours after the operation the patient had a severe chill, the temperature went up to 38° C., and the pulse became weak and frequent (102). Later, the temperature became 39° and the pulse 125, the throat, tongue, and lips very dry, and finally the patient became delirious. At intervals hypodermatic injections of caffeine and of ether were given, and finally two injections of serum, each of 500 grammes. Syncope soon came on and was followed by coma, and twenty hours after the operation the patient died. Perspiration and the secretion of urine were much diminished after the operation. The author states that he has employed spinal anæsthesia (cocaine) in two cases; in one there was the fatal result just described, while the other showed all the symptoms of pronounced cocaine intoxication, but recovered. In conclusion, it may be said that in those cases of obliterating arthritis complicated by arterio-sclerosis with thickening of the aorta the employment of intraspinal injections of cocaine is not only dangerous, but in some cases it may directly cause the fatal result.

Subperiosteal Fractures.—COTTON (*Boston Medical and Surgical Journal*, November 29, 1900) states that the usual type of green-stick fractures is, of course, subperiosteal, but beyond this the correspondence between the types is not close. The usual type of green-stick fractures is familiar enough. There is a giving away of the bone on the convex side—a tearing apart—while the concave side shows simply a bending of the cortical layer. There is deformity on account of the difficulty of returning the torn bone surfaces on the convex side back to the proper position, while the lack of mobility is insured by the intact layer of bone on the inner concave side, even apart from a locking of the torn bone surfaces and from the strength of the untorn periosteum. Some experiments were carried out on the cadavers of new-born and presumably normal infants to see how readily clean fractures could be produced and how much the periosteum hindered displacement at the time of breaking and on subsequent manipulation. Fractures were produced first by slow, forcible bending in the hands. There resulted: (1) In a femur: green-stick fracture; periosteum intact. (2) Tibia: green-stick fracture, with a Y-shaped fracture line; periosteum intact. (3) Tibia: exactly the same result—typical green-stick fracture. (4) Clavicle: the

bone could be bent double and back again, with some breaking of bony substance, but no definite fracture line. In none of these experiments was there any difficulty in forcibly reducing the fracture and bringing the bone back to the straight line or any necessity of completing the fracture to get good position—a much-mentioned measure which has seemed as unnecessary clinically as it proved to be experimentally. In conclusion, it seems that fractures in children showing no deformity and no appreciable mobility are not uncommon; that they might readily be overlooked; that they often need no reduction, having no deformity; that they repair with callus and quickly.

The Abortive Treatment of Gonorrhœa.—PILICQUET (*La Presse Médicale*, March 31, 1900) says that the object of the abortive treatment should not be to stop the discharge immediately, as such methods are not followed by the best late results, but are liable to produce deep injuries of the mucous membrane and give rise later to stricture, although the discharge stops immediately. The real object should be to stop the disease in the early stage, and by gradual treatment subdue the inflammation that is at the bottom of it.

There are three methods discussed: 1. That of Neisser, who uses the new silver salts in injections, argentamine, euzamine, and protargol. 2. Janet's method, by the lavage of the anterior urethra with large volumes of solution of potassium permanganate under pressure, their strength varying from 1 to 4000 to 1 to 500. 3. The method of Nogués and Hagge—the irrigation of both the anterior and posterior urethra, whether there is a posterior urethritis or not, the only precaution being to use a weak solution (1 to 2000) for the posterior urethra.

The best clinical practice is to take the better of the two latter methods. Irrigations with large volumes of weak solution of both urethras, anterior and posterior, with the simplest technique is the best. When applied in the incipiency of the disease it cures 87 out of 100 cases. After the fifth day the proportion is 11 to 100; above that limit it is not justifiable. The treatment should not be continued indefinitely; it should stop as soon as the gonococcus disappears from the pus, or five or six lavages later. Solutions of 1 to 10,000 have an action as remarkable as the stronger. They have the great advantage of not provoking pain, serious reaction, or congestions.

The lavages should take in the whole urethra, and in fact, should be urethro-vesical, since the invasion of this portion of the urethra often takes place early. One can never be certain that it is not already present. The patient should always urinate before the lavage. The urethra is then rendered insensitive by injecting a 1 to 20 solution of cocaine into the whole urethra as the patient lies upon his back. It has also the advantage of suppressing the sphincteric reflexes and facilitates the penetration to the depths of the irrigation. The meatus should be carefully cleansed with cotton and boric-acid solution before any manipulation.

Guiard prefers a simple syringe of the fountain type that is uniform in action and conveys no sensation of the pressure exerted to the operation. The other form has the advantage of conveying to the operator an idea of the pressure and progress of the fluid through the urethra, and is capable of regulation. When used by the patient the fountain syringe is preferable. A pint should be passed at a height of about two feet for the syringe above

the bed, and another pint with an elevation of three feet. The entrance of the fluid into the bladder should be hoped for rather than avoided. Two lavages a day are sufficient. Where there is great toleration, as in old cases, the proportion may be raised to 1 to 4000. In favorable cases the discharge decreases, after five or six lavages, to a little, clear drop that moistens the meatus. The irrigations should then be made once a day, then every thirty-six hours, then every two days. The strength can be decreased to 1 to 10,000. If there are symptoms of a relapse, more frequent lavage is to be employed. The urethra remains receptive for some weeks. Indiscretions in diet, drink, or sexual indulgence provoke recurrences. The patient must, therefore, be kept under observation. The solutions must be made from a stock solution of 1 to 100. It is dangerous to use the crystals, for if they do not dissolve they pass into the urethra or bladder and cause intense burning pain.

Fracture of the Two Condyles of the Femur without Articular Phenomena.—GROGNON (*Gaz. Med. de Nantes*, Nov. 3, 1900) states that the inter- and supra-condyloid fractures of the femur in which there are three fragments are characterized by a separation of the condyles on moving the knee-joint and are accompanied by a considerable articular sound. These, with the mobility of the fragments, constitute sufficient physical signs to make a diagnosis. He reports the case of a man, aged 66, who had a fall from a ladder. On examination the left leg was found to be rotated outward, and on measurement it was nearly three centimetres shorter than the other leg. The knee was not swollen and still presented its three normal depressions. About three centimetres above the upper border of the patella was a small wound, the upper lip of which was hard and elevated, while around it was a large ecchymosis. On palpation abnormal mobility was felt above the articulation with distinct crepitus; pain was referred to the anterior surface of the knee and the inferior extremity of the femur. The upper fragment was felt immediately beneath the skin at the anterior and internal part of the thigh. Probing showed that the wound in the skin was the result of the skin being pierced by the upper fragment. The popliteal space was in every way normal and the patella was freely movable. The diagnosis was made of supra-condyloid fracture of the lower extremity of the femur complicated by a wound communicating with the fracture. It was noted that in the region of the articulation there was no swelling, no synovitis, no transverse enlargement with movement of the condyles, and no interference with the movement of the patella, which are all symptoms of penetration of the joint. The wound was dressed antiseptically and continuous extension applied. On the thirteenth day the patient presented the symptoms of pneumonia, and on the nineteenth day after the accident he died. The autopsy showed that the lower fragment was in a correct position, but that this fragment was divided into two segments by a vertical line of fracture which passed exactly in the middle between the condyles into the articulation. At no time could crepitus be obtained from this intra-condyloid fracture as the condyles were maintained in place by an unbroken periosteum. There was no suspicion that the supra-condyloid fracture was complicated by the presence of another intra-condyloid fracture with penetration of the knee-joint, for there was an entire absence of symptoms which would have indicated such a complication.

PEDIATRICS.

UNDER THE CHARGE OF

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Staphylococcic Enteritis in Breast-fed Infants.—Moro (*Jahrbuch für Kinderheilkunde*, 1900, Band ii., S. 530) has undertaken to investigate the causation of an enteritis in breast-fed babies which cannot be explained by the ordinary causes due to dietetic errors in the mother or by such accidental disturbances as overfeeding or simple exposure to cold. He has examined in Escherich's clinic the stools of nurslings affected with dyspeptic troubles, and in a large number of these cases has found staphylococci.

This staphylococcic enteritis begins as an acute intestinal catarrh. Vomiting and loss of weight do not occur and fever is rare. The stools, which are acid in reaction, are ordinarily serous and are expelled in a jet. Recovery is the rule.

If the stools are examined by the staining method of Weigert-Escherich it is observed that the "blue" coli bacilli which normally exist in the stools of breast-fed infants are almost entirely replaced by staphylococci. Few at the beginning of the enteritis, they increase during the progress of the trouble and disappear as the infant recovers, when they are replaced by the blue coli bacillus. These organisms, whether white or golden, are not virulent for mice or rabbits. They manifestly come from the mother's milk, being derived from the skin or from the superficial parts of the galactophorous canals, and are swallowed with the milk. The reason why all breast-fed infants are not thus affected depends upon the number of organisms entering the milk, upon the resistance of the organism of the infant, and upon the bactericidal power of its digestive juices.

The Presence of the *Proteus Vulgaris* in the Stools of Dyspeptic Infants.—BRUNZINSKI (*Jahrbuch für Kinderheilkunde*, 1900, Band ii., S. 469) has examined the dyspeptic and fetid stools of a number of artificially fed infants in Escherich's clinic, and in all the cases found the proteus. Injected under the skin of mice, the proteus with its toxins caused death, but when cultures were mixed with the food of young dogs, kittens, or mice no diarrhoea or other morbid symptoms were produced.

Inquiring into the source of the contamination, the author examined samples of the raw or boiled milk employed in the service. The proteus was found in only one instance, in a sample of boiled milk which had remained for twenty-four hours in the hospital. It was also found that in boiled milk the proteus grew well, while in fresh milk only irregularly, and

in acid milk did not develop at all. The symptoms of auto-intoxication observed in dyspeptic children with fetid stools (pallor, weakness, loss of appetite and weight) are attributed to absorption of toxins formed in the intestine by the proteus.

Hereditary Syphilis in the Second Generation.—FOURNIER (*Wiener klinische Wochenschrift*, 1900, No. 43) has made a study of the progeny of forty-six marriages in which either both husband and wife had hereditary syphilis or the mother was affected and the father healthy. One hundred and forty-three pregnancies resulted, from which there were 39 stillborn infants, 43 abortions, and only 63 living children. Nearly all of these showed stigmata of degeneration, dystrophies, etc., and lesions, the most frequent of which were defects of eyes and teeth. These results show that children of the second generation are affected as markedly as are those of the first, and one may expect that these effects can be seen even in the third and fourth generations.

Three Varieties of Membranous Angina Produced by Organisms Other than the Klebs-Löffler Bacillus.—Systematic bacteriological examination of cases of angina has shown that other micro-organisms than the Klebs-Löffler bacillus are capable of producing membranous deposits which closely resemble in clinical appearance those of a true diphtheria.

WILLIAM G. BISSELL (*Buffalo Medical Journal*, December, 1900, p. 312) distinguishes three varieties of these non-diphtheritic anginas, due respectively to the streptococcus pyogenes, the micrococcus of sputum septicæmia, and the oïdium albicans. In the experience of the Bureau of Bacteriology of Buffalo, the oïdium albicans has never produced a membranous condition of the tonsils that has resulted fatally; but instances of streptococci and sputum-septicæmic infections have frequently occurred, followed in several instances by death of the patient. These conditions cannot be classed with the contagious diseases in the true sense of the term, for though capable of transmission by direct inoculation they do not seem to be communicable. One fatal case of streptococcus angina in a child occurred in 1896, and Dr. Biggs, of the New York laboratories, stated that several fatal cases had occurred in New York. Another case reported to the author by Dr. Thomas Bagley, of Buffalo, was a severe streptococcus tonsillar infection in a boy, aged ten years, which apparently in the last extremity was cured by anti-streptococci serum. The membrane extended from the tonsil to the pharynx, into the post-nasal passages, and entirely covered the soft palate; the right tonsil was completely covered.

A fatal case of membranous tonsillitis due to the micrococcus of sputum septicæmia occurred in Buffalo in 1897. The patient was a young woman, and death resulted about the tenth day of the disease.

As regards the oïdium albicans, many instances have occurred in the experience of the Buffalo laboratory in which the physician has recorded diphtheria and the culture revealed only an abundance of the thrush fungus. The membrane in these conditions has been noted as being present on the tonsils, the sides of the cheeks, the uvula, and, in one instance, a cast of the upper portion of the œsophagus was submitted for inspection. From the

sanitary stand-point, none of these non-diphtheritic anginas require quarantine.

A Method of Rendering Cow's Milk Easily Digestible.—VON DUSGERS (*Münchener medicinische Wochenschrift*, November 27, 1900) suggests the following plan: The milk can be first boiled, if desired. Just before feeding the milk is heated to the temperature of the body and slightly coagulated with a small amount of rennet; it is then stirred to break up the curd, which is thus comminuted, and the mixture resembles normal milk. Children take this readily and the danger of the formation of large, tough curds is obviated. The author has used this method extensively, with very gratifying success.

Glandular Fever due to Pneumococci.—LÖNNER and FROIS (*Revue mensuelle des Maladies de l'Enfance*, February, 1901, p. 78) report a case of so-called glandular fever (*fièvre ganglionnaire*) in a child, aged three years, which gives suggestive data on the etiology of this as yet imperfectly understood condition. The child's grandfather had died of pneumonia on August 16th, and had not been isolated from the child until the later stages of the disease. Shortly after the funeral the child developed coryza and a slight cough and was taken to the country, where she remained until about the beginning of September. Five days before coming home, after exposure to cold, she had become suddenly feverish; and on the following day swelling on the left side of the throat was noticeable. This was found to be due to enlargement of two glands, one submaxillary, the other retromaxillary. Pressure over the latter was distinctly painful, but over the other gave rise to little or no complaint. There was also diffuse redness of the pharynx, with coryza, but no stomatitis and no swelling of the tonsils or of the posterior pharyngeal wall. A certain degree of polyadenitis was noticeable. From this time on the redness of the throat rapidly disappeared, but fever of intermittent type continued for four days and the swelling gradually localized itself in the retromaxillary region. By September 15th the fever had disappeared and only slight swelling of the two glands remained. This was still noticeable a month later, and there were evidences of enlarged axillary ganglia and also of tracheobronchial adenopathy. Bacteriological examination of the throat at the height of the febrile stage revealed the presence of the pneumococcus of Talamon-Fränkcl, which was fatal for guinea-pigs in twenty-four hours.

The actual causation of the adenopathy is attributed to the nasopharyngeal catarrh of three weeks' duration, aggravated by taking cold. The pneumococcus found in the throat had without doubt existed there in the same degree of virulence since the beginning of the coryza, which began about the time of the grandfather's disease and was probably contracted from that source. In this the case resembles Hirtz's case, reported to the Société des Hôpitaux, October 26, 1900. The term glandular fever seems to the authors to be justified in this case. The infection had been general from the start, and during its height it seemed that the adenitis was responsible for the recurrences of infection.

According to Neumann and Comby, this affection generally depends

upon a streptococcus. The interval between the coryza and the explosion of the glandular fever is explained by our modern ideas of the parasitism of the bucco-pharyngeal mucosa (Widal, Besançon). Conditions of resistance are essentially variable in man, and one can conceive that their etiological influence is preponderant in the diseases caused by our habitual guest, the pneumococcus.

A Case of Transmission of Measles from Mother to Fœtus.—TELESFORO FIORI (*Gazz. degli osp. e della clin.*, June 10, 1900) states that transmission of measles through the placental circulation has been recorded in only six instances. In fourteen cases of pregnancy complicated by measles there were eleven abortions or premature births. The infants born at term and attacked by measles almost all die in the first days of life.

The case observed by Fiori occurred in a grave epidemic. The mother was a peasant, aged twenty-two years, who had borne a child at term in 1897. On May 20, 1899, at the end of a second pregnancy, she developed a measles rash, which had almost disappeared on the 23d, the day after her baby was born. The infant, a girl, appeared to be fully developed; on the skin of the face and neck were morbillous macules of large size, leaving little interval of healthy skin. There was also conjunctivitis, lachrymation, and rhinitis, with a few râles in the lungs. By May 27th the exanthem had extended to the entire body. On June 1st desquamation had begun, and by the 6th the baby was entirely well.

THERAPEUTICS.

UNDER THE CHARGE OF

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Diabetes Mellitus and Salol.—DR. TESCHENACHER, adopting the recommendation of Ebstein to use salol in diabetes, reports his observations on nine patients. Of these six were helped, in the others the action was *nil*. The action was developed independent of dietary regulations. The drug was given in comparatively large doses (fifteen grains) three or four times a day for five to six days. An interesting feature of this observation was that the polarity of the sugar in the urine was inverted. After the drug is discontinued the sugar slowly reappears.—*Therapeutisches Monatshefte*, 1901, Heft i., S. 23.

[The author's observation might have been of more service if he had indicated what the types of diabetes were that he was treating. As a general proposition it may be stated that while salol is useful in most instances of hepatic and in few of pancreatic diabetes its failures are by no means infrequent.—R. W. W.]

Dyspeptic Glycosuria and its Treatment.—Dr. ALBERT ROBIN, in the examination of the urine of 1600 patients suffering from gastric hyperæsthesia, found that 5.2 per cent. contained sugar. In one set of these patients alimentary glycosuria was in evidence; in a second there was a true diabetes, not differing from other forms of diabetes save in the matter of its origin. To this latter class he gives the name dyspeptic diabetes. It is a type distinctly amenable to treatment, although it may be converted into a persistent and chronic diabetes. This dyspeptic glycosuria may form a preface to chronic diabetes. The chief pathogenic factor, according to the author, is a lack of, or an irregularity in, the reflex stimulation of the glyconic functions of the liver. In the treatment of the simplest cases an absolute milk diet may suffice. If the glycosuria persists, moderate stimulation of the liver may be indicated. Antipyrine with sodium bicarbonate, sodium and potassium arsenites, codeine, belladonna, and valerian are among the best remedies for this purpose. Should the sugar continue and the line that separates glycosuria from diabetes be passed, the treatment recommended is as follows: Strict hygiene; one hour and a half before lunch and dinner a powder consisting of antipyrine and sodium bicarbonate, aa three grains, should be taken in a little Seltzer water. Vichy water to be taken during meals. After eating the patient should take a powder of calcined magnesia, sodium bicarbonate, and prepared chalk, aa about ten grains. If there are severe attacks of pyrosis with augmentation of the sugar, Robin advises the following: Calcined magnesia, ℥iv ; bismuth subnitrate, ℥ij ; prepared chalk, ℥ij ; codeine, gr. i; sodium bicarbonate, ℥ijss . Divide in ten powders, to be given in intervals between eating. Proper dietetic measures should be followed. Fowler's solution in three to five-drop doses, t. i. d., may be of service as accessory medication.—*Revue de Thérapeutique*, 1901, No. 68, p. 103.

Treatment of Diabetes.—Dr. VAN NOORDEN, in a study of some 600 cases of diabetes, gives the following general results obtained under varying lines of treatment. Jambul, used as the extract in drachm doses in water before luncheon and on retiring, is a good general drug. While it has no very marked action on the elimination of the sugar, in combination with diet and other hygienic procedures it is of service. In certain cases in which it seems necessary to increase the amount of carbohydrates ingested, the use of sodium salicylate, or of aspirin, is followed by a diminution in the amount of sugar, or, rather, the sugar excreted is held in check, notwithstanding the increase in the amount of carbohydrates taken. Carlsbad waters, especially when taken warm, have a beneficial action on the patients, especially on the dyspeptic symptoms. In a few instances the use of ordinary warm water has been followed by excellent results. As aids to special indications in the treatment a number of remedies may be useful. The salicylic acid compounds have a beneficial action on the pruritus; bromides

are valuable for the nervous symptoms, notably the insomnia and cardiac palpitations. Opium is indicated only for those patients who develop grave neurotic symptoms as a result of enforced dietary hygiene. Of the various analgesics, antipyrine is of service in the treatment of neuralgia. Diarrhœa, flatulence, or other intestinal disturbances are best treated by bismuth preparations. The salicylates have given the best results, notably the di-thio-salicylate or thioform.—*Deutsche Praxis*, 1901, No. 1, S. 1.

Treatment of Insomnia.—DR. G. LYON, speaking of the general lines of treatment, says that hygienic measures occupy a foremost place. Alcohol, tea, coffee, and tobacco should be stopped, and the diet regulated. It is unwise to permit such patients to eat too heartily, and all foods which have been found to digest slowly should be avoided. This is of importance, as patients should not be permitted to sleep while digestion is going on. The temperature of the sleeping room should not be above 60° F. It is inadvisable to have a fire in the room, and the windows should be open. From the stand-point of medicinal treatment he recommends for simple insomnia trional, chloralose, urethane, amylene hydrate, and somnal. In conditions accompanied with fever potassium bromide with a small amount of morphine is one of the best hypnotics. In insomnia from pain he recommends morphine hypodermatically, chloral, combined with morphine and hypnal, being analgesic from the antipyrine it contains. In certain special forms of insomnia definite medication is advisable; thus for tertiary syphilis potassium iodide is of more value than hypnotics; in cardiac diseases, circulatory remedies; in paludal poisoning, quinine sulphate; in Bright's disease, a milk diet; in tuberculosis, morphine is of more value, and in insomnia of dyspeptics, dietary regimen.—*Revue de Thérapeutique*, 1901, vol. lxviii., p. 178.

Morphine and the Stomach.—DR. B. HIRSCH considers two features of the action of morphine on the stomach—its effects on the motor mechanism and on the secretion of normal hydrochloric acid. Fluids when taken by the normal stomach are passed into the duodenum in within ten to fifteen minutes, but under the influence of this drug there is a tonic spasm of the muscular fibres about the pylorus which prevents the stomach's contents from passing into the duodenum, at times for several hours. The hydrochloric acid is at first diminished, but it is later markedly increased. Both effects are ascribed to central influences in the medulla.—*Centralblatt für innere Medizin*, 1901, No. 2, S. 72.

Chloretone.—DR. E. IMPENS has made a most thorough study of this comparatively new hypnotic, which is produced by the action of acetone on chloroform. It may be termed a tri-chlor butyl-alcohol. It is naturally compared with chloral hydrate. After a long series of animal experiments the author shows that chloretone is two and one-half times as toxic as chloral hydrate; in small doses it has little action on respiration, but does diminish the inspiratory incursion. In large doses it reduces the respiratory effort at least 40 per cent., and the volume of respiration at least 60 per cent. It, therefore, diminishes pulmonary ventilation very markedly. Chloretone paralyzes the vasomotor centres and thereby induces marked dilatation of the

capillaries. There is a marked decrease in blood-pressure, at times as much as 43 per cent. This reduction is not alone due to its action on the blood-vessels, but it paralyzes the heart also. This toxic action is pronounced in doses sufficiently large to induce narcosis. Sleep is accompanied with lowering of the temperature, which is due at least in part to protoplasm paralysis. In one point alone does it prove more valuable than chloral hydrate, in that it is less irritable by reason of a slight analgesic action. He concludes by stating that chlorotone is an extremely dangerous narcotic, much more dangerous than chloral hydrate.—*Archives Internationnelles de Pharmacie*, 1901, No. 8, p. 77.

[This report is entirely at variance with clinical observation, which shows that chlorotone in amount many times greater than the fatal dose of chloral hydrate merely produces profound sleep.—R. W. W.]

Colloidal Silver as a Specific.—Dr. P. VUETZ advocates the use of colloidal silver as an efficient means of combating sepsis. He reports a number of illustrative cases, all resulting favorably. Should his results be substantiated, a distinct advance step in therapeutics can be recorded. He has used the unguentum Credé in larger doses than those usually prescribed (forty-five grains), using it in one innunction. In patients suffering from phlegmon, lymphangitis, and lymphadenitis his results were excellent. In one case of pneumonia innunctions over the chest were employed. The patient recovered promptly, but no special credit is given to the therapy, save that recovery began almost immediately after the use of the remedy. In two severe toxic cases of scarlet fever and in one of diphtheria favorable results followed promptly after the introduction of the treatment. The results were equally striking in two patients suffering apparently from acute appendicitis. Three patients suffering from puerperal sepsis recovered.

From his experience in the twenty cases reported the author is led to believe that as an effective agent against various pyogenic organisms colloidal silver should be regarded as taking first place, and that the results are certainly encouraging that an internal antiseptic has been made practicable.—*Allgemeine medicinische Central-Zeitung*, 1901, Nos. 19 and 20, S. 61 and 73.

Petroleum and the Treatment of Acute Articular Rheumatism.—Dr. HECTOR SARATIDIS makes a careful study of the action of petroleum administered by massage in acute articular rheumatism. The remedy has a large use among the hilly in oil-producing countries of Europe as well as here. The author, however, has made systematic observations with a view to determine its real value. As a result of its use by massage, ten minute *stances* once or twice a day, he concludes that the treatment of this disease by petroleum is one of the best modes of treatment known to him for several reasons. Its cheapness makes it universally applicable, at home and abroad, in touch with a phurimney or not; it is not necessary to drug the patient; the petroleum alone will bring about a cure. It lowers the temperature very shortly. Its action is probably due to its action on the nerve filaments in the nervous membranes of the joints as well as a penetrating antiseptic effect. Complications of the endocardium were not recorded by the author. A further advantage is that it may be used in rheumatism accompanied by

Bright's disease, in which condition the salicylates are contraindicated.—*Revue de Thérapeutique*, 1901, vol. lxxiii., p. 73.

Preventive Treatment of Hepatic Colic.—DR. CHAUFFARD outlines the indications for the prophylactic treatment of biliary calculi. The most important remedy is sodium salicylate. The work of Stadelmann, Doyen, and Dufour has shown that it is a powerful and persistent hepatic stimulant, non-toxic to the liver parenchyma, save in immense doses; and it thereby renders the biliary secretions more abundant, more fluid, and less liable to deposit calculi. In addition it is an excellent antiseptic, being especially valuable in mild infections of the gall-bladder, which are now held to be accountable for most of the calculi formation. The doses should be moderate, not over fifteen to thirty grains a day, preferably divided equally in three to six doses at meal times. Sodium benzoate may be combined with salicylate, in equal doses, but it is less energetic.—*La Semaine Médicale*, 1901, No. 1, p. 1.

On Tetranitrol.—DR. M. HUCHARD, in a short résumé of his work on erythrol tetranitrate, speaks of this remedy as of much importance. He believes that in the early arterio-sclerotic changes, the presclerotic period, in the absence of pathological alterations, characterized by simple increase in tension, it is of great value. In confirmed arterio-sclerosis, in coronary angina, and in hyperdilatation of the heart from peripheral vascular constriction; in uric acid dyscrasia, in gout, in tabetic crises, and in interstitial nephritis this remedy is indicated. It has the great advantage of mild prolonged action. It commences to act in from fifteen minutes to three-quarters of an hour, and if continued in one to two-grain doses, four or five times a day, it keeps the bloodvessels in a state of reduced tension. It further avoids the disagreeable effects on the hæmoglobin induced by others of the nitrite group. The author has employed it in some one hundred and twenty patients during the past four years, and has found it singularly free from the unpleasant effects of nitroglycerin, such as pulsating temporals, etc. Mannitol nitrite has given similar results, quercite penta-nitrite also, hydroxylamine, a closely related body, is too irritating to the gastric mucosa.—*Bulletin de l'Académie de Médecine*, 1901, vol. lxx., p. 288.

[Personal observation shows that it is the most valuable of all the vasodilators for constant use. The apothecaries should use great care in dispensing else serious accidents may occur.—R. W. W.]

Obesity and its Treatment.—DR. STREBEL, in addition to the well-known dietary prescriptions, contributes some interesting details to the treatment of this obstinate condition. He adds the electric light bath to the usual procedures. Hot air baths constitute one of the best means of keeping the condition in check, but it is only too frequent that precordial distress, palpitations, syncope, and vomiting are induced by this means; certain patients with heart trouble cannot take such baths. For such especially are the electric light baths available. Among the gymnastic exercises advised by the author is the familiar one of resting on one's back and coming to the sitting posture. This should be done regularly ten to twenty

times at a *seance*, once or twice a day, on rising and retiring. As a cardiac tonic he recommends camphor, preferably in oil used hypodermatically. The electric light *seances* are to be carried out twice a week. After an exposure of twenty minutes to an arc light the neck is enveloped in cold compresses and after the *seance* a bathing at a temperature of 86° F., followed by five minutes at 64° F., then massage and friction.—*Deutsche medicinische Zeitung*, 1901, No. 3, S. 28.

Antipyrine in Rheumatism.—At a recent meeting of the Société de Thérapeutique, Paris, M. LIXENSIER reported on the use of the newer aromatic synthetics in rheumatism. He believes that in doses of forty-five to sixty grains a day the results are identical with those obtained from the salicylates, and the disagreeable effects much less. He further thought that antipyrine had a distinct effect in diminishing the tendency to pericarditis, endocarditis, and other cardiac complications.—*Revue de Thérapeutique*, 1901, vol. lxviii., p. 151.

Dymal.—DR. L. KOPP has made some studies on a new compound—didymium salicylate—which has been termed dymal. It is an impalpable powder, without odor or taste, and is best prescribed in the form of an ointment. In deep ulcers of the leg, cutaneous gangrene, and in burns, even of the third degree, it has proved of value. Its action as an antiseptic is demonstrated also in a variety of infected wounds. It is of value, in the author's hands, in eczema, in psoriasis, in hyperidrosis, in ichthyosis, and in pruritus. Its comparative inexpensiveness gives it an advantage over some of the newer products used for the same purpose. It is a chemical by-product.—*Therapeutische Monatshefte*, 1901, Heft 2, S. 127.

OBSTETRICS.

UNDER THE CHARGE OF

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Induced Labor, Symphysiotomy, and Embryotomy.—In the *Monatsschrift für Geburtshilfe und Gynäkologie*, 1900, Band xii., Heft 5, GROSS reports the case of a multipara whose first labor was terminated by embryotomy and whose second pregnancy was ended by induced labor. In the third pregnancy labor was induced, and the head descended partially into the pelvic brim, but came no further, the occiput rotating toward the promontory of the sacrum, with a large caput succedaneum developing. Symphysiotomy was performed and the forceps applied to the head. It was impossible to deliver the head, and craniotomy was accordingly done. The head was

found excessively hard, the sutures and fontanelles almost closed. The mother made a good recovery.

The pelvis in this case was considerably flattened, the external conjugate being 17 cm. As the patient was a multipara, the birth-canal, aside from the bony pelvis, was in a favorable condition for the delivery of the child. The choice of symphysiotomy, however, was unfortunate in view of the degree of pelvic contraction and the excessive comparative size and hardness of the head. The writer has collected three other cases from the literature in which symphysiotomy and the use of forceps failed to deliver the child, and in which embryotomy was performed in addition.

[In our experience, symphysiotomy is adapted to cases of slight disproportion only between the head and the pelvis. In well-marked disproportion the chances of foetal death are too great to warrant the selection of the operation.]

The Importance of Bacteria in the Vagina as a Source of Puerperal Infection.—In the *Zeitschrift für Geburtshilfe und Gynäkologie*, 1900, Band xliv., Heft 1, STICHER contributes an interesting paper upon this subject. Reasoning from the anatomy of the vagina and the character of the tissues surrounding it, Sticher became convinced that bacteria from the skin or clothing must necessarily find access to this portion of the body. Water used in bathing must also be a possible source of contamination.

To determine the latter he caused patients to bathe in water containing cultures of bacteria, and afterward proved the presence of these germs in the vagina by inoculation tests with vaginal secretion.

While it is true that we cannot hope to exclude all bacteria from the birth-canal, we may find a rational explanation in clinical freedom from infection in the condition of the mucous membrane. So long as this is not bruised, lacerated, and rendered oedematous by frequent violent manipulation during labor, or by long-continued birth, bacteria found in the vagina are rarely the cause of infection. We can control by antisepsis the introduction of virulent germs by hands and instruments, and if we avoid injury to the mucous membrane of the birth-canal during delivery, and especially if we avoid the oedema which follows long-continued pressure from delayed labor, we shall do much to prevent serious infection.

The Advantages of Induced Labor.—In the *Centralblatt für Gynäkologie*, 1900, No. 17, GRUSDEW reports the case of a patient with a flat pelvis who had been pregnant nine times. By the induction of labor she had five living and healthy children and remained herself in good health. She came under his observation in the ninth month of pregnancy. At eight months' gestation and by the use of the bougie and elastic bags he was enabled to bring on a spontaneous labor, from which the mother and child made a good recovery. He cites his case in opposition to statistics which exaggerate the danger of induced labor.

[When the contour of the pelvis is considered it is found that the pelvis was flattened only in one diameter, and that its oblique diameters were ample. There is no mention made of the relative stature of the parent, and the reason for the induction of labor seems to be the pelvic contraction *only*.

In our experience, cases like the one reported are most successful for the induction of labor. If the oblique diameters are of good size it is almost invariably possible to bring an eight months' fœtus safely through such a pelvis. Where, however, the pelvis is symmetrically contracted or is markedly rachitic, with irregular contraction, the chances for the survival of the fœtus are very greatly diminished.—[Ed.]

Pregnancy and Labor in a Patient who had Previously Suffered from Rupture of the Uterus.—In the *Monatsschrift für Geburtshilfe und Gynäkologie*, 1900, Band xii., Heft 1, p. 115, SROGANSKY reports the case of a woman, aged twenty-six years, who was brought into the hospital in her fifth labor with symptoms of rupture of the womb. She was anesthetized, a dead child extracted by forceps, and the after-birth removed. A complete rupture was found on the anterior wall of the uterus, extending into the lower uterine segment. Abdominal section was performed because of the continuous hemorrhage. It was found that the laceration began at the left round ligament and extended toward the right side to the ligament of the right side. The rent was closed by sutures and the abdomen closed. The patient made a good recovery and left the hospital.

A year afterward she presented herself at the end of her sixth pregnancy, the fœtus occupying the second position, the vertex presenting. Labor did not proceed actively, and was accordingly induced by the introduction of a bougie, followed by a tampon of iodoform gauze. The child presented by the breech and the cord prolapsed, so that the extraction of the child was necessary. On examining the uterus the site of the previous laceration was found thickened, and the stitches of the previous closure could be felt. On the third day one of the stitches was projecting into the uterine cavity; two days later it was removed. The patient made a good recovery and was discharged from the hospital, the pelvic organs being in a nearly normal condition.

The Treatment of Pernicious Nausea of Pregnancy by Therapeutic Abortion.—In *L'Obétrique*, 1900, p. 230, MERLE contributes a paper upon this subject, in which he strongly advocates the instrumental emptying of the uterus in cases of pernicious nausea in which the patient's strength steadily fails.

He would give chloroform to anæsthetic the patient, and, under antiseptic precautions, grasping the cervix with tenaculum forceps, he would dilate the uterus with solid dilators, and with the fingers remove the ovum. He would then wash out the uterus with a solution of bichloride of mercury and tampon it with iodoform gauze. He would cleanse the uterus with an instrument, somewhat resembling a brush, dipped in a solution of bichloride or a glycerin and creosote mixture.

[While we heartily agree with Merle in his decision to operate promptly so soon as the patient's strength fails, our method of performing this operation differs somewhat from his. After dilating the uterus with solid dilators we employ the donche curette, using normal salt solution, thoroughly sterile, or lysol, 1 per cent. We have endeavored to empty the uterus with the finger, but did not find the finger long enough to accomplish the purpose

thoroughly. After the uterus is emptied and douched it is tamponed with iodoform gauze. In our experience this procedure inevitably cures the nausea. It does not, however, arrest the progressive weakness which destroys the lives of so many of these patients.—ED.]

The Diagnosis of Early Ectopic Gestation with Reference to Menstruation.—In the *Archiv für Gynäkologie*, 1900, Band lxi., Heft 3, WEINDLER contributes an interesting paper upon this subject, in which he gives the results of his study of fifty cases of ectopic gestation. In each of these patients the history of menstruation was carefully obtained and the curve of each case drawn with reference to this factor.

Out of the 50 cases during the first month of ectopic gestation there were 18 tubal abortions and 1 rupture; in the second month of ectopic gestation 15 tubal abortions and 2 ruptures; in the third month 7 abortions and 3 ruptures, and in the fourth month 2 abortions. The remaining cases were those of pregnancy in a rudimentary cornu of the uterus. From these investigations the early interruption of ectopic pregnancy occurs most frequently as a tubal abortion, which is more common than rupture of the gravid tube, and this occurs most frequently during the first two months of ectopic pregnancy. A most probable cause for this condition lies in the fact that some pre-existing disease of the uterus, tubes, or ovaries is present in these cases, making it impossible for the gestation to proceed further.

In studying these cases the menstrual curve of the first months gives information of value. In eighteen cases where ectopic gestation was observed during the first month menstruation came on at the usual and regular time, but with increased bleeding. In other cases menstruation was slightly delayed and of increased intensity.

It is of interest to observe that in many cases in which ectopic gestation lasts longer than the first month menstruation occurs in almost normal manner. In these cases the diagnosis must be made without reference to menstruation by the detection of a tumor and the characteristic pain.

In cases where the ectopic gestation goes to the second, third, and fourth month there is disordered menstruation, usually menorrhœa, until the time when rupture of the fetal sac occurs, and profuse internal hemorrhage.

To summarize, menstruation is altered in early ectopic gestation as follows: Where ectopic gestation terminates in the first month it does so by a profuse hemorrhage at the time of menstruation at the end of the first month of gestation.

When the gestation goes on uninterrupted to the second or third month menstruation may be unaltered. Tubal abortion is not uncommon, and hemorrhage may occur at any time.

Where ectopic gestation persists to the third or fourth month menstruation may cease, no hemorrhage occurring until the rupture of the gestation sac.

Vaginal Cæsarean Section in the Treatment of Eclampsia.—DÜHR-SSEN (*Archiv für Gynäkologie*, 1900, Band lxi., Heft 3) adds another to his cases of vaginal Cæsarean section, the operation being performed in this instance for eclampsia. The patient was a primipara, aged thirty-one years, with a

family history of pulmonary tuberculosis. She was between six and seven months advanced in pregnancy when eclampsia developed. On admission to the hospital the patient was a stout, fat woman, with oedema of the legs, abdominal wall, and labia, and dusky face. The pulse was strong and rapid and the breathing stertorous. The patient was completely unconscious, but had slight reflexes. The urine was highly albuminous; the fundus of the uterus was at the umbilicus; the child was in the transverse position, the right shoulder presenting, and the cervix was intact, but admitted one finger. The walls of the cervical canal were very rigid; the patient was having no labor pains.

As soon as possible she was delivered by vaginal Cæsarean section under chloroform. The operation consisted in inserting a wide, single-bladed speculum, which depressed the posterior vaginal wall. The cervix was grasped with two tenaculum forceps and drawn downward. The anterior vaginal wall was freed from its attachment to the cervix by a transverse incision made with scissors. The cervix was divided in the median line to the inner os. Two additional tenaculum forceps were then inserted to grasp the borders of the cervical wound, and the fascia and vaginal walls were joined to the cervix with two catgut stitches. The cervical incision was then continued upward through the lower uterine segment, when the foetal membranes prolapsed and appeared in view. The speculum was then removed, and the tenaculum forceps grasping the cervix, combined version was performed, a foot being brought down and the child extracted. The delivery of the head occasioned some difficulty, and it was necessary to prolong the incision in the uterus for this reason. The placenta and membranes were readily removed by the finger and the uterus tamponed with iodoform gauze. The wound in the uterus was closed with six catgut stitches, while the external portion of the cervix was not brought together lest undue contraction should occur.

At this point free hemorrhage from the uterus began, accompanied by the contraction of the uterine muscle and the partial expulsion of the gauze tampon. The anterior blade of a speculum was inserted into the uterus and the uterus firmly tamponed with gauze, when the bleeding immediately ceased. The stitches were then tied and the transverse incision closed with catgut. A small strand of gauze was left to drain the space between the uterus and bladder. The vagina was then tamponed with cotton and a slight laceration in the perineum repaired. The entire loss was not greater than in a normal labor. The child lived an hour and a half, its measurements corresponding with those of the twenty-seventh week of gestation. The patient had no more eclampsia, and slowly improved. She developed a catarrhal pneumonia, probably of tubercular origin.

The wounds made by operation healed by first intention. The uterus was but slightly enlarged, inflexed, and without discharge. The patient subsequently developed nephritis, and died of heart-failure some time after her discharge from the hospital.

We are indebted to Dührssen for his method of rapid delivery by free incision in the cervix, accompanied, if necessary, by a central incision of the pelvic floor and perineum. He is especially interested in the development of vaginal Cæsarean section, and believes that the field of this operation

embraces those cases where the obstacle to labor lies in the muscular tissues of the birth-canal, with danger to the mother and child through lack of dilatation in the cervix. In cases of carcinoma of the neck of the womb he recommends this operation, followed immediately by vaginal extirpation of the uterus. His experience embraces up to the present time twenty-two operations of this kind, of which sixteen were performed for carcinoma of the cervix complicating pregnancy, two for eclampsia, two for stenosis of the cervix, one for uncontrollable vomiting, with polyhydramnios and stenosis of the cervix by scar-tissue, and one from fatal disease of the heart in a moribund patient. Of these sixteen, three died, and in each of these cases no complication occurred with the operation, the patient perishing from the disease which originally threatened her.

[It is evident that this mode of delivery must be limited to those cases in which the bony pelvis is sufficiently large to allow the child to pass readily. With these restrictions the operation seems to have a field of decided usefulness.]

GYNECOLOGY.

UNDER THE CHARGE OF

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Reproduction of Uterine Fibroids.—DOLÉRIS (*La Gynécologie*, 1900, No. 12) reports four cases of myomectomy in which small fibrous nodules which were regarded as insignificant at the time of operation subsequently developed to such an extent as to require removal. In view of his experience in these and similar cases, the writer has decided to remove only pedunculated tumors or those which are easily accessible, where the uterus appears to be of normal size. He thinks that the dangers of hemorrhage and sepsis have been underrated. In future the indications for myomectomy will be limited.

Transplantation of the Ovary.—MAUCLAIRE (*La Gynécologie*, 1900, No. 12) reports seven cases of subcutaneous transplantation, and reviews the literature quite thoroughly. In four cases the grafted ovary became infected and was removed a few days later. In the three others it could be felt three months after operation. He concludes that the ovary can be successfully transplanted both from the same and from a different individual, provided that it be absolutely aseptic.

Disturbances of menstruation and troubles following single or double oöphorectomy may be relieved in this way. If it is not deemed advisable to leave the ovary within the abdominal cavity, subcutaneous implantation may be tried, but never in cases in which infection is suspected. If there is a rise of temperature within twenty-four hours after operation, the ovary should be promptly removed.

Appendicitis and Disease of the Adnexa.—DELAGÈSÈRE (*La Gynécologie*, 1900, No. 12) reports twenty-six cases of appendicitis associated with diseased adnexa, only four of which were acute. He believes that the inflammation of the appendix is usually secondary to its attachment by adhesions, thrown out in consequence of disease of the right tube and ovary. The interference with the circulation of the appendix renders it peculiarly liable to become inflamed. The type of inflammation is usually subacute or chronic. This explanation does not apply to all cases, since in some it is clear that appendicitis was the primary condition, the adnexa being infected through the lymphatics in the adhesions. As regards the symptoms, in cases of appendicitis secondary to disease of the adnexa there is usually a history of former uterine or tubo-ovarian trouble, while the intestinal symptoms are less striking than in a case of primary appendicitis. The attack is apt to correspond with the beginning of the menstrual period, while in disease of the tube and ovary it reaches its greatest severity toward the end. In suppurative appendicitis the pain is more severe, but it may extend below McBurney's point into the painful zone of adnexal disease. In non-inflammatory affections the diagnosis is less difficult.

The writer prefers a long median incision, even in cases of suppurative appendicitis complicating disease of the tubes and ovaries, since it may be advisable to remove the uterus. The appendiceal abscess can be protected with gauze and the cavity drained through a counter-opening in the loin.

Fibroma of the Vagina.—GRUZZER (*Wratsh*, 1900, Nos. 8 to 10) reports three cases and analyzes eighty-five which he has collected from the literature. Twenty-five patients were nulliparae. The youngest was fifteen months and the oldest seventy-one years. The anterior vaginal wall was most often affected, the tumor usually developing from the submucous layer. These neoplasms are usually fibromata, and are rich in blood- and lymph-vessels, hence the frequent occurrence of interstitial hemorrhage and suppuration. They are usually encapsulated. They grow slowly and rarely reach a considerable size, the largest recorded being ten pounds.

The symptoms due to these growths are largely mechanical, varying with their size. They are most apt to be mistaken for cysts, the diagnosis being made by explorative puncture. Interstitial fibromata are difficult to distinguish from similar growths in the lower uterine segment, dermoids anterior to the uterus, and echinococcus cysts of the pelvic connective tissue. Tumors in the vaginal wall as they enlarge tend to encroach upon the canal, which is not true with paravaginal neoplasms. Pedunculated sarcomata would only be recognized on microscopical examination unless they cause constitutional symptoms. While the prognosis is usually favorable, these growths may suppurate or undergo malignant degeneration, while if they attain a large size they may cause dystocia.

The removal of polypoid tumors is simple, but the enucleation of interstitial fibromata may be quite difficult and attended with hemorrhage and suppuration.

Uterine Calculi.—RATHINSKY (*Wratsh*, 1900, No. 2) reports three cases in which the uterus contained one or more calculi varying in size from a pea

to a walnut. In one post-mortem specimen the fundus uteri had been perforated by a sharp angle of a calculus. These bodies were composed of phosphate and carbonate of lime, which were dissolved by muriatic acid, leaving traces of connective tissue in a state of hyalin degeneration. The writer regards them as simple calcified uterine fibromata. As regards the treatment, when the bodies are small they may be removed per vaginam after dilating the cervix; when they are of large size it may be necessary to perform vaginal or abdominal section according to their situation.

Endothelioma of the Uterus.—POHORECKY (*Archiv für Gynäkologie*, Band 1x., Heft 2) adds a fifth case to the four already described. The growth was discovered in a patient, aged forty-three years, being situated in the posterior lip of the cervix and bleeding freely after coitus. It was composed of a fibrous stroma, with alveoli filled with polygonal cells of an epithelial type. These cells were also distributed irregularly throughout the stroma. Lymph-spaces were observed, the cells of which seemed to have no relation to those in the interspaces or alveoli. At the base of the tumor were observed small nodules of a similar structure, which were evidently outlying foci of disease. It was evident, also, that the neoplastic cells were carried through the lymph-channels.

Treatment of Vesicovaginal Fistula.—SPASSOKONKOZKY (*Centralblatt für Gynäkologie*, 1900, No. 25) describes the following method of closing a fistula: Several sutures are passed between the vaginal and vesical mucosa. While traction is made upon these a bistoury is introduced between the sutures and the vaginal mucous membrane and a flap is dissected off. The sutures are then threaded in the eye of a catheter and are drawn through the urethra and out at the meatus. The vesical flap is thus inverted into the bladder, while the vaginal edges of the fistula are easily approximated, after which the temporary sutures are withdrawn per urethram. This method was employed successfully in five cases.

VEBER (*Wretch*, 1900, No. 28) describes a complicated case of fistula resulting from gangrene of the vagina, in which, after two failures, he succeeded in closing the fistula by taking skin-grafts from the inner surface of the thigh.

VITRAL (*La Gynécologie*, 1900, No. 6) found by experiments that the ventral decubitus is most favorable not only for the spontaneous healing of small vesicovaginal fistulae, but in order to insure success after operation. As the position is not a natural one, the patient should become accustomed to it before operation.

Uterine Fibrocyt of Unusual Size.—KNAUER (*Centralblatt für Gynäkologie*, 1900, No. 48) reports the case of a patient, aged forty-eight years, with an abdominal enlargement of six years' standing, which had caused extreme dyspnoea, rapid heart-action (pulse 160), and rapid emaciation. On auscultation a loud heart-murmur and general bronchial râles were heard. The abdomen was enormously enlarged, measuring sixty inches in its greatest circumference. The tumor was fluctuating, and a diagnosis of probable ovarian cystoma was made.

On account of the condition of the patient the operation was performed under cocaine anaesthesia (Schleich's method of infiltration). On tapping the cyst twenty litres of bland fluid escaped. The growth was intraligamentary and was removed in pieces, profuse hemorrhage resulting. The right ureter was dissected off for a space of four inches. The sac was stitched into the abdominal wound and drained. The patient made a rapid recovery. Histologically the neoplasm proved to be a cystic fibromyoma, and although it had no connection with the uterus it was inferred that it had probably originally developed from that organ, the pedicle having become separated. The solid portion weighed eleven pounds, so that it was estimated that its entire weight was fifty-five pounds.

Formal in the Treatment of Uterine Hemorrhage.—GIESSENBERG (*Centralblatt für Gynäkologie*, 1900, No. 31) reports a series of cases in which he applied concentrated formal within the uterine cavity. A 40 per cent. solution of formaldehyde was introduced on an applicator without causing pain or other bad effects. The patient was kept in bed for two days. It may be necessary to repeat it once or twice. This treatment is especially useful in climacteric hemorrhages, or where ennettement is contraindicated.

Intestinal Obstruction after Vaginal Section.—GERSCHY (*Centralblatt für Gynäkologie*, 1901, No. 48), commenting upon a case of ileus following vaginal hysterectomy, affirms that while it is desirable in cases in which gauze drainage is used that the bowels should not be moved until the infected area has been walled off by exudate, in simple cases, on the contrary, the opposite plan should be adopted. Even when the intestine has been sutured peristaltic movements can be induced before the third day by rectal impaction without endangering the wound. He allows his patients to drink freely and relieves flatus by glycerin injections, employing high enemata only when these fail.

Changes in the Endometrium in Connection with Fibroids.—PENAN (*Centralblatt für Gynäkologie*, 1901, No. 48) describes a case of extreme hyperplasia of the endometrium in a fibroid uterus. The mucosa measured an inch in thickness and under the microscope showed unmarked glandular hypertrophy, their lumina being dilated so as to form large cavities lined with cylindrical epithelium. Many cysts were observed, filled with debris, the lining cells being flattened by pressure. When divided in their long axes they appeared tortuous and corresponded in length to the entire thickness of the mucosa. As the epithelial cells were entirely normal in their appearance and arrangement, there was no reason to infer the development of any malignant degeneration.

Torsion of the Fallopian Tubes.—VAN DER BERG ("Dissertation," abstract in *Centralblatt für Gynäkologie*, 1901, No. 48) reports a case of torsion of a pyosalpinx, with complete separation of the tumor, which he believes to be unique; also a similar case of hydrosalpinx, and another in which the tube was completely separated from an ovarian cyst as the result of torsion. He collected from the literature thirty-six cases, distributed as follows: hydro-

salpinx, 23; pyosalpinx, 5; neoplasms of the tube, 5; complete separation of the tube as the result of torsion, 3. He believes that while in the case of the larger tubal sacs torsion is due to the same causes as in ovarian tumors, in that of the smaller enlargements some other etiological factor must be sought, possibly the persistence of the infantile type, predisposing to inflammation. In these cases there may be a tendency to torsion from the beginning, which is favored by early closure of the uterine end.

The writer thinks that torsion of the tube occurs more frequently than is ordinarily supposed; in fact, that it is probable that this is a common cause of hydrosalpinx and of hæmatosalpinx not due to atresia of the genital tract. The attacks of colicky pain often noted in connection with these conditions may be thus explained. The importance of torsion in ectopic gestation is evident, since it may lead to rupture.

Torsion of the Pedicle and Uterus in Ovarian Cysts.—SONNENFELD ("Dissertation," abstract in *Centralblatt für Gynäkologie*, 1901, No. 48) found marked torsion of the pedicle in 50 out of 323 cases of ovarian cystoma (15 per cent.). No cases are included in which there was not obstruction of the circulation or torsion to 180° and more. Dermoids seemed to predominate. In two cases the uterus was twisted about its long axis to 180°.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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AND

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Toxic Amblyopia from Jamaica Ginger or Methyl Alcohol.—J. DUNN (Richmond) reports two of these cases in which a debauch, including the drinking of a large quantity of "essence" of Jamaica ginger, terminated in blindness. The cases resembled others of the kind previously reported. They were seen late, giving a history of very rapid loss of sight, followed by some improvement, and, later, by further impairment of vision. The optic nerves gave evidence of atrophy probably consecutive to neuritis.—*Virginia Medical Semi-Monthly*, January 25, 1900.

E. STIEREN (Pittsburg) reports the case of a man who, after drinking heavily on Saturday, got a dozen ounce-bottles of "essence" of Jamaica ginger and consumed it before noon on Sunday. He awakened at 3 P.M. totally blind. When seen at 6 P.M. the pupils were widely dilated and unaffected by light and accommodation. There was slight retinal œdema and blurring of the edge of the optic disk, and the sensibility of the cornea

was impaired. During the night the patient was given three hot foot baths, calomel, and compound jalap powder, each twenty grains, in divided doses, and two one-eighth grain doses of pilocarpin hypodermatically. Next morning he could count fingers at ten inches. The calomel and pilocarpin were continued for two days and then followed by large doses of potassium iodide. In five days vision had improved to 20/30, and subsequently became normal.—*Journal of American Medical Association*, January 5, 1901.

H. HARLAN (Baltimore) reports two cases, in which amblyopia had followed the use of "essence" of Jamaica ginger and "essence" of peppermint. The cases were seen several months after the onset, and showed atrophy of the optic nerves. One became entirely blind and in the other vision remained at 6/200 and 7/200.

Harlan ascertained what make of "essence" had been used by these patients. It was the same brand in both cases. He obtained a considerable amount of the essence of ginger and had it subjected to chemical analysis. The analysis showed that instead of being the pharmacopœia tincture of ginger, made with ethylic alcohol, it was deficient in ginger, the deficiency being covered by the use of capsicum, and the menstruum was a mixture of one part ethylic with three parts methylic or wood alcohol.—*Ophthalmic Record*, February, 1901.

[A year ago it was pointed out (*Progressive Medicine*, June, 1900) that the points of resemblance of so-called Jamaica ginger amblyopia to methyl alcohol amblyopia would justify a careful examination to determine whether this latter drug is used in the cheap essences of Jamaica ginger. The cases that have since been reported have still further illustrated the resemblance between the amblyopias ascribed to these two substances. Stieren's case, the only one of recovery after the use of essence of Jamaica ginger, naturally takes its place with Kuhnt's single case of recovery from methyl alcohol amblyopia. It should be noticed, also, that these wood alcohol "essences" investigated by Harlan were manufactured in Baltimore, and that nearly all of the cases of "Jamaica ginger amblyopia" have occurred in the territory of which Baltimore is a principal trade centre. Since methyl alcohol is known to cause amblyopia of just this kind the strong probability that all the essence of Jamaica ginger that caused this form of amblyopia consisted chiefly of wood alcohol, makes it reasonable henceforth to class all these cases as cases of methyl alcohol amblyopia.—Ed.]

Quinine Amblyopia—A. ALT (St. Louis) reports a case of quinine blindness in a woman, aged twenty-seven years. She took six grains every two hours until twenty-four grains were taken, and then four grains every two hours up to a total of forty grains. After taking eighteen grains disturbance of vision commenced. After twenty-eight grains she could barely recognize the lamp in her room. After thirty-two grains she was totally blind. In spite of this her physician next day ordered her to take forty grains more. Light perception reappeared after three days, and two months later she had regained central vision of 20/30 and 20/20 partly; but her fields of vision remained very much contracted.

In many years practice in a quinine consuming region, this is Alt's first case of unquestionable quinine blindness; but he thinks some of the cases

of optic atrophy he has previously observed might be of this character. Alt refers to a symptom not previously described in connection with quinine blindness which he himself experienced after taking sixty grains of the muriate in an hour. This is green vision, everything appearing of a bright emerald hue.—*American Journal of Ophthalmology*, January, 1901.

H. MOULTON (Fort Smith, Ark.) reports two cases coming to him as cases of optic atrophy of long standing in which the cause had not been suspected; but upon inquiry a reliable history was obtained of the origin of the trouble. It had followed taking very large doses of quinine in early childhood, after which the patients had for a time been completely blind.—*American Journal of Ophthalmology*, February, 1901.

[The part that idiosyncrasy plays in causing quinine blindness is well recognized. Alt's case is remarkable for the smallness of the amount of quinine that caused it and for the early appearance of the symptoms. Usually the blindness comes on after all other symptoms of cinchonism have disappeared, one, two, or three days having elapsed since the ingestion of the drug. These cases, especially Alt's, illustrate a reprehensible ignorance of the toxic effects of quinine on the part of some members of the profession.—ED.]

Ophthalmia Neonatorum.—GREENOUW (Breslau) reports a study of the clinical and bacteriological aspects of this disease in 100 cases. He finds that the inflammation of the eyes in the newborn, in simple conjunctival catarrh as well as in blephorrhœa, is due to a variety of micro-organisms, among which are the gonococcus, pneumococcus, streptococcus pyogenes, colon bacillus, and yellow staphylococcus. He finds that the same patient may show in one eye a severe blephorrhœa, while in the other the gonococcus conjunctivitis may assume the appearance of a simple catarrh. In general, blephorrhœa due to the gonococcus is marked by a more copious discharge and is of longer duration than that due to other forms of bacteria. Damage to the cornea is confined to gonococcus conjunctivitis or occurs rarely in other forms. If a single careful examination before beginning treatment, or after a sufficient interval has elapsed since the application of an antiseptic fails to relieve the gonococcus in the purulent discharge, the prognosis is entirely favorable.

The discovery of the gonococcus in the discharge is a positive indication for the use of silver nitrate or some other silver preparation. In three cases presenting gonococcus blephorrhœa of equal severity in the two eyes, one eye was treated with a 2 per cent. solution of the nitrate and the other with a 5 per cent. solution of protargol, and the pus was examined each day with counts of the cells showing gonococci. The results were practically the same in each case. In one case the gonococci disappeared from the eye treated with protargol one day earlier than from the eye treated with the nitrate. In the other cases the organisms disappeared from both eyes on the same day.—*Gräfe's Archiv. für Ophthalmologie*, February, 1901

[In this trial the solutions used were not so strong as are often employed, and the protargol solution may be regarded as relatively the weaker. Certainly in solutions of these strengths the protargol would be very much the less irritant, and probably it would do less damage if improperly applied.—ED.]

DERMATOLOGY.

UNDER THE CHARGE OF

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Urticaria the Result of the Use of Formalin.—GLOVER (*British Journal of Dermatology*, April, 1901) reports the case of a young married woman, who, after the application of a lotion to the hair containing formalin in bay rum, suffered from a severe urticarial eruption which appeared the day after the first application was made, and grew worse after a second application. The eruption covered practically the entire body; the face was swollen, and great wheals were present on the trunk and extremities. It was considered that, in the absence of other possible factors, the formalin lotion was the cause of the eruption. The lotion, which still remained in the patient's room giving rise to the characteristic odor, was removed, bran baths were used, and improvement followed immediately.

A Peculiar Case of Dermographism.—FARRY (*Archiv für Dermatologie und Syphilis*, Band liv., Heft 1) reports under this title a remarkable case of chronic factitious hemorrhagic urticaria observed in a woman, aged sixty years. The affection began with the appearance of purpuric lesions in the upper eyelids and itching of the neck and breast. Scratching was followed by the appearance of hemorrhagic wheals. About a year before the death of the patient an enormous swelling of the tongue occurred which never disappeared. The pressure of the patient's clothing was sufficient to produce hemorrhagic wheals which, after lasting two to four weeks, gradually disappeared without leaving any pigmentation. These never appeared spontaneously, but were always the result of trauma. The disease lasted three years, and ended in the death of the patient from asthenia.

Lichen Ruber Pemphigoides.—BITTMANN (*Dermatologische Zeitschrift*, 1901, Band viii., Heft 1), after referring to the cases of lichen ruber reported by various authors in which bullae were present, reports at some length a new case of his own, and discusses the following questions: 1. Do the cases of lichen ruber in which bullae form represent a special atypical variety of the disease? 2. Is the formation of bullae a consequence of the administration of arsenic rather than the disease itself? 3. Have we to do, in these cases, with a combination of lichen and pemphigus—i. e., a combination of two different diseases? The author believes that, while in some of the reported cases the bullous eruption was most likely due to the use of arsenic, in others it represented a special variety of the affection. He does

not believe that these cases should be regarded as an accidental combination of two different diseases.

Psoriasis of Bullous and Rupoid Appearance.—HALLOPEAU and LEMIERRE (*Annales de Dermatologie et de Syphiligraphie*, 1901, No. 1) at a *séance* of the Société Française de Dermatologie et de Syphiligraphie exhibited a man, aged forty-seven years, with an extensive psoriasis, in whom one of the patches of eruption presented an unusual aspect. The lesions upon the trunk and upper extremities were of the ordinary type, but those upon the legs were covered with extremely thick, yellowish, hard, almost horny scales. These thick, slightly convex scales were surrounded by a ring of white epidermis which was apparently elevated by exudation underneath it. On removing this ring of epidermis, however, no fluid was found, but a whitish pasty material, which was composed of epidermic cells more or less degenerated with a few leucocytes.

Peruol in Scabies.—SACHS (*Deutsche med. Wochenschrift*, 1900, No. 39; *Dermatologische Zeitschrift*, Band viii., Heft 1) treated thirty-five cases of scabies successfully in the Breslau clinic with peruol. This substance, which represents the most active element in balsam of Peru, is a clear, odorless oil which does not irritate the skin nor soil the clothing, but is fatal to the itch-mite. After a bath (with soap, if the skin was not too much inflamed) the oil, diluted with three parts of castor oil, was vigorously rubbed in three or four times.

On Ringworm Infection in Man and Animals.—J. L. BUNCH (*British Medical Journal*, February 9, 1901) describes eight cases in which the fungus was derived from animals of various kinds; but it must not be supposed that this form of ringworm is common, because the author examined many animals which, though believed to be suffering from ringworm, really had other diseases. Valuable though microscopical examination is in enabling a diagnosis to be made, greater reliance must be placed upon cultures, which either confirm the conclusions derived from the microscope or serve to differentiate those cases in which otherwise a differential diagnosis could not be made. Cultures soon clear up the diagnosis. In cases, for example, where the spores are so closely packed that their shape necessarily appears round, the microscope is quite unable to distinguish between microsporon and ectothrix.

Trophic Disturbances in the Mammary Region Produced by the X-rays.—BARTHELEMY (*Annales de Dermatologie et de Syphiligraphie*, 1901, No. 2) at a recent *séance* of the Société Française de Dermatologie et de Syphiligraphie presented a patient, a woman, who had been treated by exposure to the X-rays for pain in the mammary region resulting from a blow. During this treatment, which lasted four months, the rays had not produced the slightest redness of the skin. At first the epidermis in the left mammary region became strongly pigmented over an area as large as two hands, and this was followed by sharp itching. Six months later superficial desquamation appeared in places, the epidermis coming off in large strips, as the hands desquamate

after scarlatina. The skin was thick, white over a considerable area, with red or violaceous zones here and there. Emphasis was laid upon the fact that the cutaneous lesions had first appeared five months after the last exposure to the rays.

Melanoderma with Cachexia and Pigmentation of the Buccal Mucous Membrane Due to Pediculosis Corporis.—CHATIN (*Annales de Dermatologie et de Syphiligraphie*, No. 12, 1900) reports the case of a man, aged seventy-eight years, who, in consequence of a severe pediculosis corporis, presented an intense pigmentation of the covered portions of the body with numerous slate-colored spots on the mucous membranes of the cheeks. The patient had also suffered from cough accompanied by great feebleness and emaciation for two months, and it was at first thought that he might be suffering from Addison's disease, but after a stay of three months in the hospital he lost his cachectic appearance, the melanoderma cleared up, and the pigmentation of the mucous membrane of the cheeks completely disappeared. The author briefly reviews the cases previously reported—nine in number.

Alopecia Arcata.—O. LASSAN (*Dermatologische Zeitschrift*, September, 1900, p. 809), in considering the etiology of this disease, thinks that the irregularity of the manifestation, its sudden advent, the absence of symmetry, the generalization over all hairy regions, and the absence of other symptoms of disease of the peripheral nerves, render the trophoneuritic theory improbable. He thinks there is evidence of contagion and infection, but that the bacteriological theory still requires to be confirmed. The treatment usually adopted by him is antiseptic. The scalp is washed daily with a strong tar soap and treated then with a 2 per cent. corrosive sublimate solution, afterward with absolute alcohol with $\frac{1}{2}$ per cent. naphthol, and, lastly, with 2 per cent. salicylic acid in oil. The galvanic treatment has not proved valuable in his hands. He recognizes only one variety of the disease.

Treatment of Rodent Ulcer by the X-ray.—J. H. SEQUIRA (*British Medical Journal*, February 9, 1901) makes a report based on twelve cases, illustrated with several photographs. Of the twelve cases eight were still under treatment, and four were under observation, ten ulcers having healed. The cases were deemed to be unsuitable for surgical treatment. In one very severe case the patient could not bear the pressure of the special apparatus which is used in the Finzen method to render the parts under treatment anemic. The current used was one of from three to four amperes. The coil was one producing a ten-inch spark, and the tube was placed about six inches from the ulcer, the adjacent parts of the skin being protected by a layer of lead-foil. The treatment lasted ten minutes, and was repeated daily. At the end of a week the ulcer was clearer and somewhat shallower. A month later the improvement was remarkable. In the course of another month the ulcer had almost entirely healed. An excised piece of tissue from the healed border showed it to be made up largely of connective tissue.

Pigmentation of the Skin from Drinking Beer Containing Arsenic; Peripheral Neuritis.—GALE and HALLAM (*Medical Press*, February 27, 1901,

p. 226) report eight cases of peripheral neuritis accompanied by pigmentation of the skin occurring among beer drinkers; the average amount of beer daily was three pints; six of the cases were women, two men. The illness began with digestive disorders, numbness and tingling sensations in the hands and feet, soon followed by loss of power in the arms and legs. All the cases presented the following signs: 1. Varying degrees of peripheral neuritis up to complete loss of power. 2. Brown pigmentation of the skin all over the body, most marked on the abdomen and chest, with, later, desquamation of the pigmented skin. 3. Thick desquamation of skin and redness of palms and soles. 4. The mental state was good in all but one case, a known alcoholic. Analysis showed the beer to contain arsenic in dangerous quantity.

Finsen's Light Treatment of Lupus and Rodent Ulcer.—MORRIS and DORE (*British Medical Journal*, February 9, 1901) present a lengthy and valuable article on this subject, the result of experimental work, concluding that although they cannot as yet make any definite statements as to permanent cure, the results attained have fully justified their expectations, and that they are of opinion that in these diseases better and more permanent results in the way of cure are to be obtained than in any other forms of treatment hitherto employed. In their experiments electric light instead of sunlight was used. A current of seventy-five amperes and about sixty volts was sufficient to produce a good reaction in the majority of the cases. All depends upon the reaction, this depending upon many factors, such as the focus being exact, the size of the focus, the clearness of the water and lenses, the quality of the carbons, etc. Reaction occurs in from five to twenty-four hours, is usually slight for the first few days of treatment, then becoming more marked, increasing rather than diminishing with continued treatment. After hyperæmia a bleb forms, bursts and dries, to form a thick yellow crust at about the end of a week, and in ten days or so the sore had completely healed. As is well known now, the treatment can only be carried out in an institution where the necessary complicated apparatus is at hand, as explained in the original articles of Finsen and Bic. Morris and Dore briefly sum up the advantages and disadvantages of the method. The advantages were reliability, painlessness, excellent cosmetic results, less liability to relapse, and avoidance of surgical measures. The disadvantages are the long time required, the small area treated at a time, and the expense.

Rodent Ulcer and Epithelioma Contrasted.—F. T. PAUL, of Liverpool (*British Medical Journal*, February 9, 1901), in a clinical lecture directs attention to the difference between these diseases, first stating that they are pathologically distinct in origin, appearance, and history. Great as the difficulty has been in deciding exactly what sort of carcinoma rodent ulcer should be considered, there is a general consensus of opinion among pathologists that it commences in one of the appendages of the skin in contradistinction to epithelioma which commences in the mucous layer. Rodent ulcer usually begins as a small whitish pimple in the skin, the surface of which is smooth and often shiny from thinning of the epidermis, while in epithelioma the affected area is roughened and often warty. Rodent ulcer is limited to skin tissue; whereas epithelioma may occur wherever squamous epithelium exists.

Rodent ulcer very rarely infects the lymphatic tissue. It tends in its course to marked erosion and destruction, destroying in its progress all kinds of tissue, and very rarely, except in the beginning, forming a solid formation or growth outward, and in this differing from epithelioma. Radical surgical treatment is recommended.

Epitheliomatous Giant-cells.—AUDREY (*Annales de Dermatologie et de Syphiligraphie*, 1900, No. 12) concludes a brief study of the giant-cells found in epithelioma, as follows: In Malpighian epitheliomata there exist multinucleated elements, plasmodia, occasionally very richly developed. These cells are of epithelial origin, and exist independently of any participation of the leucocytes. They probably represent a form of degeneration of the epitheliomatous cellular elements.

OTOLOGY.

UNDER THE CHARGE OF

CHARLES H. BURNETT, A.M., M.D.,

EARL SURGEON, PRESBYTERIAN HOSPITAL, ETC., PHILADELPHIA.

General Perichondritis of the Auricle.—A general perichondritis of the auricle occurs under three forms according to Pohl, viz., an idiopathic, a secondary, and a tuberculous form. The first named is caused by the entrance of infectious germs at some spot on the auricle or their absorption from the auditory canal. The second form, called secondary perichondritis, is the result of trauma or the extension of external otitis or some other inflammatory process from the external meatus. The tuberculous form is found, according to HAUG (*Langenbeck's Archives*, vol. xliii.), in individuals already manifesting symptoms of tuberculosis elsewhere, or presenting a hereditary tendency to tuberculosis. Haug has demonstrated the tubercular nature of such cases by an examination of portions of the diseased cartilage of the auricle as well as of the pus evacuated from the diseased tissue.

In perichondritis of the auricle there is a general involvement, redness, and tumefaction of the entire auricle. The disease is usually the result of some exterior irritant, like cold, or a skin wound of the auricle, and very often both auricles are simultaneously affected. Under proper treatment recovery ensues without deformity.

The treatment should consist in soothing antiseptic solutions or ointments to the affected parts, with attention to the general health of the patient. If effusion beneath the perichondrium occur it must be treated like a case of othematoma with effusion.

LEUTERT (*Archiv f. Ohrenh.*, vol. xlvii.) reports that in all of his cases of perichondritis of the auricle he succeeded in obtaining the *B. pyocyaneus* in pure culture. The perichondritis in each instance followed incision of the posterior wall of the auditory canal in the so-called radical operation on the

mastoid. He thinks it would be well, therefore, in the after-treatment of cases in which a radical operation has been performed to bear in mind the possible presence of the bacillus pyocyaneus and adopt measures for its destruction. In *abscess of the auricle* the staphylococcus albus was found and was considered to be the causative factor.

Excision of the Ossicles.—W. SCHROEDER (*Archiv f. Ohrenh.*, April 19, 1900) reports the results of one hundred and thirty extractions of the hammer and anvil in the treatment of chronic purulent otitis media. He shows that this is the only sure means of benefiting suppuration in the attic, so important, because so near the brain. This operation should always precede any form of radical operation on the mastoid, as the former will generally cure the chronic purulency and prevent mastoid caries. Mastoid radical operations are thus avoided. The results of excision of the malleus and incus in chronic purulent otitis media in public practice among the poor are 50 per cent. of cures; in private practice, 80 per cent. Caries of the incus was present in 88 per cent. of Schroeder's cases. In 41 per cent. of these cases the malleus was normal. The hearing was improved in 65 per cent.; unchanged in 22 per cent., and slightly impaired in 13 per cent. of these cases. Facial paralysis occurred in two instances, but disappeared without treatment in six weeks.

GRUNERT and ZERONI (*Archiv f. Ohrenh.*, vol. xlv.) of Schwartz's clinic in Halle, express the very justifiable regret that excision of the malleus and incus, through the external auditory canal, has of late been superseded by the "radical operation" upon the mastoid for the cure of chronic purulent otitis media, even in cases in which the endeavor should have been made to check the purulency by the simple operation of excision. Although this fact can in a measure be excused on account of the difficulty of the technique of excision of the ossicles through the auditory canal, and also the possible necessity of a second operation if the excision of the ossicles has not led to a cure of the purulent otitis, yet in the interest of our patients it must not be underrated. In a large number of their patients observed for many years after excision of the ossicles through the auditory canal this operation has brought about a lasting cure. They also state that in a number of cases in which they have been called upon to perform the radical operation on the mastoid they have found conditions in this cavity which seemed to indicate that the excision of the malleus and incus through the auditory canal would have been sufficient to have cured the purulency in the middle ear, and thus prevented the mastoiditis leading to a mastoid operation.

Operations on the Mastoid.—GRUNERT and ZERONI (*Archiv f. Ohrenh.*, August 3d, vol. xlv.), report one hundred and twenty-four operations on the mastoid performed in Schwartz's clinic in Halle. Twenty-eight of these were performed for the relief of acute mastoiditis, ninety-five for chronic mastoiditis, and one for the relief of neuralgia of the mastoid. The last named case was not cured. Of the acute cases twenty-three were cured; one died from meningitis; one suffered from pyæmia and was under treatment at the time the report was written, and in three cases the final results

were unknown. Among the acute cases was the youngest patient in the 124, viz., a child aged seven months. The results in the ninety-five chronic cases were as follows: Unknown, 25; not cured, 12; cured, 44; under treatment, 5; and 9 died. The oldest patient of the entire series of 124 cases was in this last-named class, viz., a woman aged sixty-nine years. Among the acute cases cured was one of pyæmia with ligation of the internal jugular, and one of pyæmia calling for operation on the sinus and ligation of the jugular. Among the chronic cases cured were two of pyæmia, operation on the lateral sinus and ligation of the jugular. Of the chronic cases four died of meningitis, four of pyæmia, and one of rupture of a cerebral abscess.

Mastoiditis from Use of Nasal Douche; Death from Leptomeningitis.—GRUNERT and ZERONI (*Archiv f. Ohrenh.*, August 3d, vol. xlv.) have reported the case of a woman, aged fifty-seven years, who, by using a nasal douche, induced acute otitis media and mastoiditis. Chiselling open the mastoid was performed, and for four days the wound ran a normal course and entire convalescence seemed near at hand. On the fifth day after the mastoid operation fever, vomiting, and headache with deviation of the left eye (to the side opposite to the diseased mastoid) set in, and death occurred on the sixth day after the mastoid operation. The autopsy revealed purulent basilar meningitis with also purulent infiltration of the dorsal surface of the cerebellum, and pus in the posterior horn of each lateral ventricle. After removal of the dura of the base of the skull there was found on the anterior superior surface of the left petrous pyramid, between the labyrinth and the apex of the petrous bone, a loss of substance 4 mm. wide, filled with pus and reaching backward as far as the superior petrosal sinus, in which there was a somewhat firmly adherent clot. The labyrinth and carotid canal were free from pus. A grayish ositic centre in the apex of the pyramid adjoined the deep extradural abscess.

It was held that the cause of the fatal purulent leptomeningitis was the deep-seated extradural abscess on the front surface of the petrous pyramid. In the absence of pus in the labyrinth of the ear and carotid canal one is forced to conclude that the course of the deep-seated extradural abscess was the intense otitis of the walls of the middle ear, extending all the way to the pyramid of the petrous bone. One learns from this case, that presented no suspicious symptoms, neither when admitted to the hospital, at the operation, nor for some days thereafter, how careful one must be in giving a prognosis even in an apparently harmless case of acute mastoiditis. A deep-seated extradural abscess, giving no size of its existence, may suddenly dash all hopes of seeing a patient recover, even after convalescence apparently has set in, as in the case reported above.

Chronic Suppurative Mastoiditis.—Latent mastoid empyema often presents the appearance of trigeminal neuralgia, or it may exhibit external symptoms slight in comparison to the internal underlying lesions in the mastoid cavity. In fact, even an extradural otogenous abscess may exist as a latent condition. If in the presence of otitic symptoms, especially if chronic, persistent pain continues anywhere on the side of the head corre-

sponding to the diseased ear, empyema of the middle-ear cavities from the attic to the mastoid without free outlet should be suspected. Pain now indicates either this condition or a graver one, viz., extradural otogenous abscess.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Disinfectant Properties of Alcohol.—The conclusions arrived at by Epstein and others concerning the value of alcohol as a disinfectant have been corroborated by BERTARELLI (*Il Policlinico*, 1900, through *Revue d'Hygiene*, January, 1901), who experimented with silk threads, infected with fresh and old cultures of *B. prodigiosus*, *B. pyocyaneus*, *B. pestis*, *B. cholerae*, *B. typhosus*, *Staphylococcus pyogenes aureus*, and sporulating *B. anthracis* and *B. subtilis*, which were exposed at different temperatures and for periods ranging from five minutes to fifty days. The best results were obtained with alcohol of 50 per cent. strength, the power diminishing with departures in both directions from this dilution. Thus, 70 per cent. strength was more powerful than 25 per cent. strength, and both than 88 and 99 per cent. The action of any dilution on spores was practically nothing. Alcoholic solutions of corrosive sublimate (1 : 1000), carbolic acid (3 per cent.), chromic acid (1 per cent.), silver nitrate (0.40 per cent.), and zinc sulphocarbolate (2 per cent.) were more active the less the alcoholic strength.

Tin in Canned Foods.—Specimens of canned meats of various ages up to four years were examined by F. WIRTHLE (*Chemiker Zeitung*, 1900, xxiv., p. 263) with reference to the presence of tin and the probable influence of duration of contact on its amount. He concluded that the corrosive action increases slightly after the second year, and that the meat itself takes up a larger amount than the juice, but the amounts found in both were slight. The most marked corrosion occurs where the tin comes in contact with the fatty parts. With regard to the toxicological importance of tin in meats and fish, A. RÖSSING (*Zeitschrift für angewandte Chemie*, 1900, p. 147) asserts that the danger must be extremely slight and is unworthy of attention, for the compound formed is insoluble and so resistant to the action of the digestive juices that only the merest traces can be taken up. According to Wirthle, in some cases the compound is basic stannous chloride; in others a sulphide. Rössing believes it to be mainly an oxide.

Concerning the Anopheles Mosquitoes.—From the results of very numerous observations, PROFESSOR A. CELLI (*Journal of the Sanitary Insti-*

tute, January, 1901, p. 619) asserts that the larvæ of *Anopheles* live in water clean or foul, clear or turbid, acid or alkaline, and ferruginous, but not in water containing salt (salt marshes, sea water, and mixtures with fresh water in the proportion of two to one), very strong sulphur waters, nor water that is putrid from the putrefaction of animals and textile plants. They avoid water in which there is any movement (currents, rippings, caused even by light winds; mechanical disturbance, as by the passage of boats), or which is without growth of aquatic plants, of which they prefer the filamentous species which do not occupy the whole free surface of the water where they rise to breathe. The mature mosquitoes bite in the evening and at night. They are transported by winds, in grass, hay, etc., and in vehicles of various kinds.

The old idea that putrid waters and the emanations therefrom are causes of malarial fevers is inconsistent with the fact that the specific gnats do not live in stinking waters, and the prejudice against brackish water and salt marshes on the score of being conducive to malaria is likewise inconsistent with repeated demonstrations that the larvæ cannot live in very brackish or salt water. He points out that all hydraulic improvements designed to free districts from malaria must sweep away the conditions favorable to the life of the infecting mosquitoes—must either remove fresh waters from the surface or put them in motion. When complete removal of marsh water is impossible, as is often the case where the movement of the water is hindered by vegetation, the larvæ have abundant opportunity for development; and even where currents exist there are, along the edges, incurvations or grass where the larvæ hide. Hence, drainage canals should be periodically flushed at intervals of twelve to fifteen days to clear them of larvæ, and all marshy vegetation should be torn up as it grows. In malarial districts, dwellings should be built in the highest and driest situations possible, though even there the mosquitoes may go or be carried, as happens in the highest parts of the Roman Campagna, which are greatly infested. Even the upper floors of tall buildings are not free from the visits of mosquitoes when they are hungry for blood, and all windows and outer doors should be protected against them by wire netting, and the screen doors should be provided also with springs to cause them to be kept closed when not in use. The walls of the rooms should be light in color, so that mosquitoes resting on them may easily be seen. Sometimes even the fine outlets of the chimneys should be screened. Trees in the near neighborhood of houses act as a hiding place for mosquitoes, which in the evening try to gain entrance, especially into rooms in which lights are burning.

In agricultural operations, he points out that no turning up of the soil can, as has been believed, be the cause of malaria. Irrigation cannot be detrimental, provided the water reaches the soil in no greater amount than it does in a shower of rain and the canals by which it flows in or out are not of such a character as to allow of stagnation. But ditches in which water becomes stagnant and vegetation accumulates afford good breeding facilities to the mosquitoes. Periodical flushing at intervals of twelve to fifteen days will overcome the difficulty. Rice fields cannot be made healthy, because, even though the water may run, there are always dead points where there is no current, and there the larvæ are protected. Moreover, the plants themselves afford a shelter.

According to *The Lancet* (March 23, 1901, p. 875), Dr. Patrick Manson has proposed an expedition to the Pacific Islands to investigate the causes of the apparently capricious distribution of the malarial mosquitoes, the presence or absence of which depends upon local conditions inimical to them. It is proposed to study the mosquitoes of an island where the disease is unknown and those of another where it is endemic, and then to convey the specific varieties to the non-malarial place for the purpose of attempting there to breed them under laboratory conditions and in the company of fauna and flora peculiar to the place, with the view to discover something antagonistic to their existence, which may then be introduced into localities where malaria is endemic.

Selenium Poisoning from Impure Beer.—At a meeting of the Royal Commission on Arsenic Poisoning, held on March 15, 1901 (*British Medical Journal*, March 23, 1901), in the course of the investigation of the recent extensive epidemic of arsenic poisoning due to beer made with impure glucose, Dr. F. W. FUNNCLIFFE stated that he and Dr. Rosenheim had found selenium in the incriminated sulphuric acid (used in converting starch to glucose) to the extent of about 0.3 per cent. He found also one part in 7000 of invert sugar. Examination of beer made with brewing material manufactured with acid containing selenium compounds demonstrated that the poison passes into the beverage. Animal experimentation has shown that the symptoms of selenium poisoning and of arsenic poisoning are in all respects similar. But the action of selenious acid is cumulative, and this helps explain the symptoms which were attributed to arsenic in cases in which the beer consumed contained but small traces of that substance. The marked occurrence of wasting was to be explained by the specific action of selenious acid, as might also the occurrence of symptoms in cases in which arsenic was not found in the ingesta.

According to Willcox (*The Lancet*, March 16, 1901, p. 778), while selenium gives no mirror in the absence of arsenic in the Marsh test, it has a most decided effect upon the nature of the mirror where arsenic is present. The proximal portion of the mirror is red in color, while the rest has the usual appearance; and the extent of the reddened portion varies according to the amount of selenium present. He found no selenium arsenic mirrors in an examination of many samples of arsenical beer.

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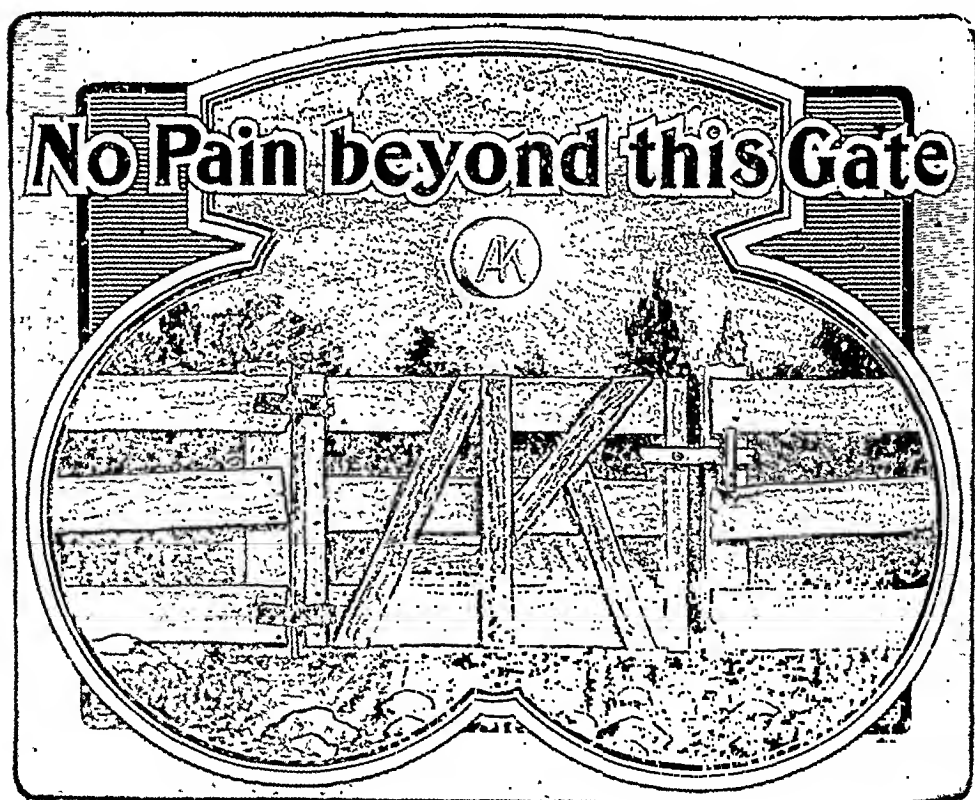
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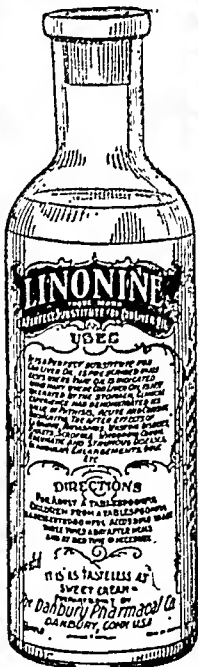
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CANCER DISTRIBUTION AND STATISTICS IN BUFFALO FOR
THE PERIOD 1880-1899, WITH SPECIAL REFERENCE
TO THE PARASITIC THEORY.¹

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WITH the real or apparent increase of cancer throughout the civilized world, at a rate which gives cause for alarm, renewed interest has been aroused in this dread affliction, and in many countries laboratories are being established for the scientific investigation of the nature and cause of cancer, and societies are being organized for the statistical study of the disease.

The question of paramount importance is whether cancer is or is not a parasitic disease, as upon the answer to this broad question depend the special lines of research that are indicated for elucidating the exact cause and the control of the disease.

It must be admitted that up to the present time no convincing scientific demonstration of the parasitic nature of cancer has been adduced and generally accepted, though certain most interesting and suggestive findings have encouraged the hope that the pathologist might be close on the trail of the real agent of the disease. Such scientific evidence, taken in conjunction with much indirect and cumulative evidence derived from many sources, has given good reason for holding tentatively the theory that cancer is parasitic in origin and for pursuing its study upon this theory. In the meantime, and before definite assurance is had that cancer is the result of parasitic infection, no line of study should

¹ Summary of paper in the Third Annual Report of the Director of the New York State Pathological Laboratory of the University of Buffalo to the New York State Legislature, April, 1901.

be neglected that offers any prospect of elucidating the main question of parasitic origin.

Next to the direct scientific study the most promising field of research seems to lie in the statistical study of the disease, in the collection and analysis of observations on the distribution and spread of the disease, and its relation to race, social and economic conditions, and natural environment. The latter method of study has already yielded most important clues for the parasitic theory, and if carried out systematically and extensively might, perhaps, result in the establishment of this theory beyond reasonable doubt. The history of medicine offers many examples of the establishment by indirect methods of study—by cumulative evidence, observations, statistics, etc.—of the parasitic or infectious nature of different diseases in advance of the scientific demonstration of such.

Guided, then, by such thoughts and by the work of others along this line, the writer was induced to undertake the investigation here recorded with a view to ascertaining whether the statistical study of cancer in the city of Buffalo offered any support for the parasitic theory of cancer or furnished any incidental side-lights that were of interest to the subject. The main purpose was to find whether there occurred in the city any *local foci of the disease* in special regions of the city or in certain houses, out of proportion to the population of such places, and, in case such foci occurred, what relation existed between them and their natural environments and the conditions of race, social status, and habits of the population. So far as the writer is aware no similar investigation on so large a scale has been attempted for a large city, though the same principle has been applied by a few investigators in small towns and villages in Germany, France, and England. Of the various previous investigations none is so striking and important as evidence for the parasitic theory as that of Behla,¹ at Luckau, in Germany, which has attracted wide-spread interest and attention. It seems well, therefore, before stating the results of our investigation in Buffalo, and as indicating somewhat the lines that our study has followed, to give a brief summary of Behla's work, as follows:

Behla's Observation. The town of Luckau consists of a central main portion with 3000 inhabitants, flanked on the east and west respectively by subdivisions of the city or suburbs (*vorstadt*), called the Kalau and Sandow suburbs, each with a population of 1000, making a total population of 5000 for the entire town. During a period of twenty-two and one-half years (1875–1898) no cases whatever of cancer were noted in

¹ Robert Behla. Ueber vermehrtes und endemisches Vorkommen des Krebses. Centralblatt f. Bak., Parasit., u. Infekt., 1898, B. xxiv., Abteil. 1, S. 780, 829, 875, 919; and Die geographisch-statistische Methode als Hilf-factor der Krebsforschung. Zeitschrift f. Hygiene u. Infectiouskrankheiten, 1899, B. xxxii., S. 123.

the western suburb, Sando; cases were not infrequent (nicht selten) in the central main town, and 73 deaths from cancer (cancer of the stomach and liver predominating) out of a total of 663 deaths from all causes occurred in the eastern suburb, Kalau. Cancer, therefore, caused 1 out of every 9 deaths in the suburb Kalau as against 1 out of 25 to 30 in the entire town, whereas no cases at all occurred in the western suburb, Sando. In Prussia, as a whole, the mortality-rate from cancer was 1 to 30 to 50. During the last year and a quarter of this period cancer claimed 10 victims in the suburb Kalau, or 1 out of every 100 inhabitants.

During the period of twenty-two and one-half years the number of inhabitants and their habits of life remained the same. The population was agricultural and lived on the products of its own gardens and fields. The dwellings were similar in kind and size and were generally damp. The soil of the suburb Kalau and of the central town was flat, low, and moist; that of the suburb Sando was elevated, sandy, and dry. The special distinction of the three divisions of the town consisted in the location of a ditch (graben) which, deriving its water from a stream on the west below the suburb Sando, without touching this suburb, closely encircled the central town and the eastern suburb, Kalau. Cancer followed the course of this ditch, occurring not infrequently in the central town chiefly among those whose gardens bordered on the ditch, and most frequently in the eastern suburb, Kalau, all the gardens of which were watered from this ditch. In the suburb Sando, which was not touched by the ditch, no cases of cancer were known. The suburb Kalau, which we may designate as the *cancer-suburb*, consisted of a main street, with two cross streets, containing 127 houses, whose gardens in general backed upon the surrounding ditch. Of the 127 houses 56 were cancer houses, 43 representing a single case, 10 two cases, and 1 four cases.

Behla's opinion was that the peculiar and unequal distribution of cancer through the different parts of the town of Luckau could be explained only by reference to the location of the ditch. In the cancer suburb the gardens were all watered from the ditch, which contained stagnant, foul water, and the people were in the habit of rinsing the vegetables grown in their gardens in water taken from the ditch. Behla believed that the garden vegetables became thus infected, and in turn infected the people with cancer. He considered the various conditions of life and habits among the people, and focused down to the uncooked garden vegetables, of which large quantities were eaten raw, as the most probable source of infection.

It is evident that such observations as the above, if correctly and carefully made, and if multiplied so that the factor of chance be eliminated, must be regarded as strong evidence, if not as proof, of the parasitic origin of cancer. With this striking example in mind, as

well as many other somewhat similar observations, showing the irregular distribution of cancer and its tendency to occur in foci, resembling the well-known endemic foci of other infectious diseases, the writer undertook to ascertain the distribution of cancer in the city of Buffalo during the twenty-year period, 1880-1899 inclusive, with the results shown in the following paragraphs:

The statistics were collected from the original official certificates of death, signed in each case by a physician, preserved as the mortality records of the Board of Health of the city of Buffalo. To select out of these records only the cases of malignant disease required the careful examination of all death certificates or (in some years) the transcribed individual records of the same. Such cases only were collected as were shown by the death certificates to have had as the primary or accessory cause of death malignant tumor, under any of its various appellations—*e. g.*, cancer, carcinoma, epithelioma, sarcoma, malignant growth, etc. A separate card for collecting the statistics of each case was used, covering the following points of inquiry:

Name.			
Age,	years	months	days.
Sex.			
Color and race.	single	married	widowed.
Cause of death.			
Accessory cause of death.			
Place of birth.			
Father's name and birthplace.			
Mother's name and birthplace.			
Place of death.			
Date of death.			
Occupation.			
How long resident here.			
Last place of residence.			
Physician reporting.			

With respect to residence, the cases may be classified as follows:

1. Those dying at home, whose residence in the city (street and number) was given.
2. Those dying in public or private hospitals, usually following operation, whose residence in the city (street and number) was given.
3. Those dying in public or private hospitals whose residence was not stated, who were buried in Buffalo, and whose city residence was found in the records of the institution where death occurred or in the city directory.
4. Those dying in hospitals, without ascertainable city address, and buried in Buffalo.
5. Those dying in hospitals or lodging houses, without city address on death certificate, on the hospital records, or in city directory (year of death and year preceding death), and buried outside of Buffalo, as

shown by the records of the city or of the institution where death occurred.

6. Those dying in Buffalo, whose residence was stated to be outside of Buffalo.

Of these six classes Nos. 5 and 6, regarded as non-resident and including 114 cases, were excluded from further consideration; Nos. 1 to 4, including 2299 cases, were regarded as resident and were used as the basis of the following statistics and tables; and Nos. 1 to 3, including 2005 cases whose city residence was known, were plotted on the city map according to the residence of the cases. The number of deaths from malignant disease, by years, classified by certain facts of residence, is shown in Table I.

TABLE I.

Showing the number of deaths from malignant disease reported to the Buffalo Board of Health, classified according to residence, and by year, for the twenty years 1880-1899.

	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	10 yrs 1880- 1889
Classes 1-3. Resident cases, city address known. (Plotted on map.)	42	47	56	58	68	91	61	87	100	97	710
Class 4. Resident cases, city address not known. (Not plotted on map.)	8	9	13	9	9	6	9	6	9	10	88
Classes 1-4. Total cases accredited to Buffalo.	50	56	69	67	77	100	70	93	109	107	798
Classes 5-6. Non-resident cases, not accredited to Buffalo and excluded from statistics below.	...	...	...	...	...	1	3	3	5	1	13
Classes 1-6. Total cases from all sources reported to the Buffalo Board of Health.	50	56	69	67	77	101	73	96	114	108	811

	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	10 yrs 1890- 1899	20 yrs 1880- 1899
Classes 1-3. Resident cases, city address known. (Plotted on map.)	112	108	97	103	133	121	140	155	170	156	1295	2005
Class 4. Resident cases, city address not known. (Not plotted on map.)	17	18	15	14	16	21	33	21	21	27	206	291
Classes 1-4. Total cases accredited to Buffalo.	129	126	112	117	149	145	173	176	191	183	1501	2299
Classes 5-6. Non-resident cases, not accredited to Buffalo and excluded from statistics below.	2	1	7	3	14	11	18	10	16	19	101	114
Classes 1-6. Total cases from all sources reported to the Buffalo Board of Health	131	127	119	120	163	156	191	186	207	202	1602	2413

House Distribution, as Plotted on Map of City. The distribution by residence through the city of the 2005 deaths from malignant disease whose residence was known¹ was plotted on a large-sized map² (3 x 2 feet) of the city. A colored dot was stamped on the site of each case, red for cases dying in the decade 1880-1889 and green for cases dying in the decade 1890-1899. Multiple cases occurring in the same house were indicated by red squares inclosing the dots representing such cases. We regret that it is impracticable to reproduce this map here, but the essential features shown by it can be stated briefly, as follows:

A glance shows the irregularity of distribution of the dots—a scarcity in certain parts and a concentration in other parts of the city. A remarkable concentration is shown in those wards inhabited largely by foreigners, and particularly by Germans. Is this concentration real, due to increased frequency of cancer in such parts, or only apparent, due to greater density of population in the wards showing the greatest number of dots? To ascertain this the number of dots must be compared with the size of the population in each ward. As the relative distribution of population through the city has changed during the twenty years, and the ward boundaries also were changed in 1891, there is no accurate method of estimating for the whole period the cancer-rate based upon a common standard of population by wards, and only a rough approximation can be obtained. This has been done (Table II.) by comparing the number of dots in each ward with the ward population of 1900 (United States census), and thus obtaining the number of dots in each ward per 1000 of population. The resulting ward rates thus obtained serve the purpose of indicating roughly the ward distribution of cancer based upon a common standard of population. The actual rates are less important than the general tendencies shown by the rates, broadly considered. Those wards showing higher and lower rates than the average rate for all wards were marked on the map, against the ward number, with a plus (+) or minus (—) sign respectively, indicating that the cancer rates in such wards were high or low, and the amount of such variation is shown by percentages in Table II.

¹ Correction for all changes in house numbers was made by references to the official records of such changes in the Department of Streets of the city of Buffalo.

² This map is reproduced in full size in the Third Annual Report of the Director of the State Pathological Laboratory to the New York State Legislature for 1901, above referred to, and can be obtained also from the publishers, the Matthews-Northrup Co., Buffalo.

TABLE II.

Showing the distribution of cancer mortality by wards and according to the relative population of wards.

Wards.		Population (1900).	Cases.	Cases per 1000 of population (1900).	Per cent. above or below average rate. ¹
Ward	1	6,488	36	5.5	— 17 per ct.
"	2	9,201	57	6.1	— 8 "
"	3	9,853	96	9.7	+ 41 "
"	4	10,028	71	7.0	+ 4 "
"	5	16,611	52	3.1	— 53 "
"	6	7,371	101	13.7	+ 101 "
"	7	8,536	84	9.8	+ 46 "
"	8	9,632	58	6.0	— 10 "
"	9	16,177	96	5.9	— 11 "
"	10	8,009	70	8.7	+ 29 "
"	11	29,111	70	2.3	— 65 "
"	12	7,765	61	7.8	+ 16 "
"	13	9,888	83	8.3	+ 23 "
"	14	29,326	92	3.1	— 53 "
"	15	9,257	92	9.9	+ 47 "
"	16	8,337	76	9.1	+ 35 "
"	17	18,190	91	5.0	— 25 "
"	18	29,071	93	3.1	— 53 "
"	19	11,708	60	5.1	— 23 "
"	20	8,897	83	9.3	+ 38 "
"	21	13,601	127	9.3	+ 38 "
"	22	15,687	91	5.8	— 13 "
"	23	12,858	90	6.9	+ 2 "
"	24	25,694	109	4.2	— 37 "
"	25	20,985	66	3.1	— 53 "
Total 25		352,387	2005	Average 6.7	

As thus indicated, nearly every ward in the region showing a concentration of dots is shown to represent a real and not merely an apparent concentration of cancer. The region showing the greatest concentration is distinctly a region occupied largely by foreigners, Germans greatly predominating, consisting of wards 15, 16, 6, 12, 13, 7, 8, 9, 10, 3, and 4. Compare with this area of concentration (German quarter) an area of more than equal population, inhabited chiefly by native born, consisting of wards 22, 24, 25, 17, and 18, which shows only about one-half the number of dots. The contrast is striking. The figures for the two areas are as follows:

German wards	Population	104,753	Cases	888
Native "	"	109,527	"	450

To represent the contrast even more strikingly compare ward 24, which is one of the finest residence sections in the city, occupied chiefly by native born, with the three wards most strongly German in their population, namely, wards 15, 16, and 6. The population of the two sections is about equal—25,694 and 24,965 respectively—but the cancer cases in the German wards (269 cases) are about two and one-half times as many as those in the American ward (109 cases). Until the United

¹ The only ward that showed a change in its relative position as to cancer frequency—i. e., above or below the average—for the entire period, 1880-99, and for the second decade, 1890-99, was ward 9, which changed from a minus (—) ward for the whole period to a plus (+) ward for the second decade.

States census of 1900 is published we have no exact method of estimating the proportion of foreigners and different races in the various city wards, and we have therefore been obliged to rely upon the officials of the city government for information in regard to the race distribution of population in the different wards of the city. We have no doubt, however, of the substantial accuracy of their estimates.

There is shown, then, a centre of concentration of cancer in those wards in which the German element predominates. As to other classes of foreigners, we can draw no conclusions from the map distribution alone considered, as there is less tendency upon the part of other nationalities to concentrate in certain parts of the city than is shown by the Germans. There are, for instance, no distinct English, Canadian, or Irish quarters in the city. The Poles, for reasons stated below, are classed with the Germans and share with them in large measure their ward distribution. There is, however, a distinct Italian quarter in the lower end of ward 19, centring in Canal Street, a quarter very densely populated. This quarter shows a conspicuous absence of any concentration of dots on the map, and the ward of which it is a part shows a low rate (see Table II.). This fact agrees with the low cancer rate in Italians, as shown below under *Race Distribution*. That a true concentration of cancer occurs among the Germans out of proportion to their representation in population will be shown again below by other considerations, thus confirming the concentration in the German quarter shown by the map.

Aside from the relation to race, no relation between cancer distribution and local conditions could be determined from the map distribution. There is no relation of cancer to the water-courses and water-front of the city, thus differing from Behla's finding at Laekau. All the wards bordering on the water-front show low rates. No peculiar conditions are found in the German wards to excite suspicion, so far as we have been able to observe. It is a fact worthy of mention, however, in connection with Behla's charges against uncooked garden vegetables, that the Germans quite commonly raise a few garden vegetables and are in the habit here, as elsewhere, of eating many of them uncooked, and thus possibly contaminated by reason of some unknown conditions of nature. No special conditions of soil, however, seem to characterize the German quarter as opposed to other parts of the city.

Multiple-case Houses (Cancer Houses). As indicated on the map, 44 of the houses in which cases of death from cancer occurred represented more than one case, 41 houses having had two cases and 3 houses three cases each. Of the 2005 deaths from cancer where the residence was known, 91, or 4.53 per cent., occurred in such houses. While we are not able to affirm that such a percentage is more than would be naturally expected, still we are somewhat inclined to this opinion in view of

the fact that Buffalo had 37,290 dwellings in 1890 and probably more than 50,000 in 1900.

An inspection of all the "cancer houses" was made, and they were found in general to be one or two-story frame houses, without basements or cellars, and only exceptionally of the class known as large tenement houses. In fact, the city contains few large tenement houses, most of the houses being small single dwellings, surrounded each by its own yard. The average number of occupants in the cancer houses was found to be 6.94 per house—about the same as in the city at large, which showed an average of 6.84 persons per dwelling in 1890 (United States census). The same tendency shown by the cases in general is seen also in the cancer houses to concentrate in the German district. None of these cancer houses were institutions or hospitals, public or private, all such institutions being excluded from consideration.

The interval of time separating the deaths from cancer in the different cancer houses is shown in Table III. In almost half of the houses the interval was less than five years, and in three-quarters it was less than ten years.

TABLE III.

Classifying the multiple-case houses by the interval elapsing between the cases.

1st year	4	}	}	...36	
2d "	.	.	.	.	.	.	.	.	.	6
3d "	.	.	.	.	.	.	.	.	.	6
4th "	.	.	.	.	.	.	.	.	.	3
5th "	2	}			...15
6th "	.	.	.	.	.	.	.	.	.	4
7th "	.	.	.	.	.	.	.	.	.	2
8th "	.	.	.	.	.	.	.	.	.	2
9th "	6	}			... 8
10th "	.	.	.	.	.	.	.	.	.	1
11th "	.	.	.	.	.	.	.	.	.	2
12th "	.	.	.	.	.	.	.	.	.	3
13th "	1	}	... 3		
15th "	.	.	.	.	.	.	.	.	.	2
17th "	.	.	.	.	.	.	.	.	.	1
19th "	.	.	.	.	.	.	.	.	.	2
										471				

In only a minority of the cancer houses was it possible to ascertain the relationship or lack of such between those dying of cancer in such houses. Blood relationship could be ascertained in only four double cases, as follows: Father and daughter, mother and daughter, father and son, and brother and sister. The second death followed the first in these four double cases, respectively, in the second, sixth, first, and third year. Five of the eight cases were in Germans, the other three in Americans.

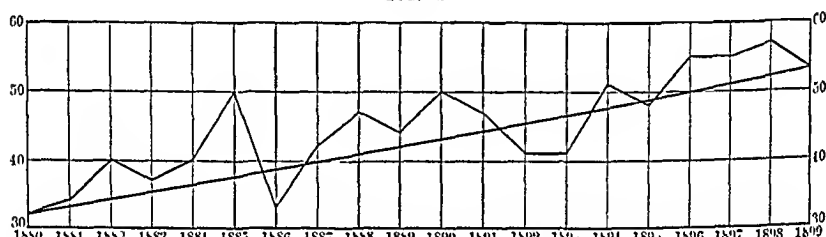
The relationship of husband and wife was found five times, all the

¹ The difference between the number of multiple-case houses and the intervals is due to the occurrence of triple cases in three of the houses.

ten individuals being Germans. The second death followed the first in the first, second, second, fourth, and ninth year respectively.

Increased Cancer Rate. Fig. 1 shows graphically the increasing rate of cancer mortality per 100,000 of estimated¹ population in Buffalo, yearly, for the twenty years 1880-1899. During this period the rate increased from 32 to 53 per 100,000 of population, or 65 per cent. This progressive increase agrees with a similar marked increase for all countries in the civilized world, and is the chief cause for alarm in the cancer problem. While tuberculosis and most other infectious diseases show a steadily decreasing mortality in different countries, everywhere cancer continues to increase year by year in the rate at which it claims its victims. After crediting the various factors that have been shown to account for an increasing cancer rate, viz., increased longevity, improved certification of deaths, more accurate diagnosis, etc., still there seems to be a large residue of cancer increase that cannot be accounted for by such explanations. There must obviously be a limit to the operation

FIG. 1.



Showing the increasing death-rate from malignant disease per 100,000 of population in Buffalo yearly for the period 1880-1899.

of such factors as explanation of the continued increase of cancer. The rate of increase is too high, progressive, and general throughout the world to be anything less than real, and we believe that expert opinion is gradually reaching this conclusion.

The rate of increase in Buffalo is seen to be less marked for the second than the first decade. This is probably explained, in part at least, by the well-known falling off in immigration during the second decade as compared with the first. As will be shown below (see *Race Distribution*), the mortality rate from cancer for foreigners in general, and for Germans in particular, is much higher than for native born, hence the

¹ The exact population was known for the years 1880, 1890, and 1900, from the U. S. census. For intermediate years it was estimated by the mathematical formula of geometrical progression, the method employed by the Registrar-General of England. This method applies strictly only to the natural increase of population by the excess of births over deaths, and not to the increase or decrease by immigration and emigration. The latter fluctuate year by year, due to temporary influences operating to increase or check immigration and emigration. Hence, the curve between the end points can be regarded merely as approximately correct. Still, as there is no importance attaching to the rate for the intermediate individual years, and as merely the general rate of increase through the entire period is of interest, the plotting serves its chief purpose in showing this general increase through a period of twenty years, and is therefore of almost equal value with a plot correct for all its intermediate points.

ratio of these two general elements of the population (foreign born and native born) must be considered in drawing conclusions from the cancer rate and the change of such rate through consecutive periods of time. This important factor seems to have been previously unrecognized and neglected by writers on the cancer rates of the cities and States of the United States, where foreigners constitute so considerable a proportion of the population. The Buffalo statistics show that foreigners, as a class, are about four and one-half times more susceptible to cancer than are those of native birth, and the United States census of 1890 showed for twenty-eight large cities in the United States that foreigners were about three and one-fifth times more susceptible to cancer than those of native birth. That the increased cancer rate in Buffalo—from 32 to 53 per 100,000 of population from 1880 to 1899—cannot be attributed simply to an increased proportion of foreign immigrants in the population of the city is indicated by the fact that the city's foreign population increased only from 33 per cent. to 35 per cent. of the entire population from 1880 to 1890 (United States census). The proportion of foreigners in 1900 has not yet been published, but will probably show a decrease from the figures for 1890. It would be interesting and valuable to show the rate of increase of cancer per 100,000 of corresponding population separately for foreigners in general, Germans in particular, and those of native birth; but it would be possible to do so only for the census years 1880 and 1890, and as the figures for single years for each class are relatively small, the chances of accidental variation would render such a calculation of little value.

Race Distribution. The distribution of malignant disease according to the place of birth of those affected is shown in Table IV. The striking fact in the race incidence of cancer shown by this table is that, individually and collectively, *all foreign nationalities show a higher rate than the native born* (United States) in proportion to representation in population.¹ Those of foreign birth, as a class, constitute 35 per cent.

¹ The representation in the population of the city of the different nationalities and classes used as the basis of calculation is that shown by the U. S. census of 1890. This was chosen as the closest approximate estimation obtainable for the twenty-year period, falling midway in the period. The changes occurring from 1880 to 1890 in some of the more important classes are shown in the following table, based upon the U. S. census:

Year	1880	1890	1900
Total population	155,131	255,661	352,387
Native born	66.9 per ct.	64.9 per ct.	Not published.
Foreign born	33.0 "	35.0 "	" "
German	16.4 "	16.6 "	" "
Polish	0.4 "	3.4 "	" "
Irish	6.6 "	4.5 "	" "
English	2.7 "	2.7 "	" "
Scotch	0.7 "	0.6 "	" "
Canadian	3.8 "	4.1 "	" "
Italian	.....	0.7 "	" "

The census figures for 1900, not yet available, will probably show a falling off in the percentage of the foreign-born population. As a moderate increase is shown in the percentage of

of the entire population and 70.9 per cent. of the entire cancer mortality of the city, whereas, by contrast, the native born represent 64.9 per cent. of the population of the city and only 29 per cent. of the cancer mortality. Hence, estimated on an equal basis of population, the death-rate from cancer in the city of Buffalo is found to be 4.59 times greater for those of foreign birth than for those born in the United States.

TABLE IV.

Showing distribution by race and race-groups and by sex of malignant tumor in Buffalo, 1880-1899.

Birthplace.	Male.	Female.	Both.	Ratio m. to f. the latter taken as 100. ¹	Per ct. of all cases. ¹	Per cent. of population of Buffalo by nationalities (U.S. Census, 1890). ¹	Ratio of frequency of malignant disease by races, compared with native born as 1.00. ¹
Germany	416	482	928	92	40.3	16.6	5.50 times 1.00 (U.S.)
United States	227	410	667	51	29.0	64.9	1.00 (standard of comparison).
Ireland	111	183	294	60	12.7	1.5	6.40 times 1.00 (U.S.)
England	41	77	118	53	5.1	2.7	4.27 " " "
Canada	23	66	89	31	3.8	4.1	2.09 " " "
Poland	29	23	54	116	2.3	3.4	1.52 " " "
Scotland	8	20	28	40	1.2	0.6	4.51 " " "
France	9	11	20	.....	.....	.....	.....
Italy	8	7	15	.....	.....	0.7	1.93 " " "
Switzerland	7	3	10	.....	.....	.....	.....
Russia	5	1	9	.....	.....	.....	.....
Holland	4	3	7	.....	.....	.....	.....
Austria	1	4	5	.....	.....	.....	.....
Sweden	2	3	5	.....	.....	.....	.....
Belgium	1	1	2	.....	.....	.....	.....
Spain	1	2	2	.....	.....	.....	.....
Norway	1	1	1	.....	.....	.....	.....
Denmark	1	1	1	.....	.....	.....	.....
Europe (not specified)	1	2	3	.....	.....	.....	.....
Not stated	11	27	41	51	1.7	.....	.....
Total	938	1361	2299	68	100.0	.....	.....
Germany and Poland	473	507	982	93	42.7	20.1	1.81 times 1.00 (U.S.)
Europe except Germany and Poland	199	321	520	61	22.6	.....	.....
Europe except Germany	228	346	571	65	21.9	.....	.....
United States & Canada	250	506	756	49	32.8	.....	.....
Great Britain & Ireland	160	280	440	57	19.1	8.0	5.13 " " "
All foreign countries	711	921	1632	77	70.9	23.0	4.59 " " "
All foreign countries except Germany & Poland	236	411	650	57	28.2	11.8	4.31 " " "

Individually each foreign nationality shows a similar preponderance over the native born, varying from 1.93 to 6.40. It would be unsafe

foreign born during the first decade, and as there is good reason for believing that a corresponding decrease will be shown for the second decade, we are probably not far amiss from the true approximation for the whole period. In taking the known figures for 1890 as the basis of calculation, the truth in so doing we acknowledge the introduction of possible errors. Therefore, the resulting figures, representing the frequency of cancer in the different race groups compared with those of native birth, cannot be regarded as exact but only as approximate and are to be treated by us in drawing conclusions from the same. The most accurate method would be to state the rate of cancer per 10,000 for each race, and we regret that it is impossible to obtain data for such an estimation.

The rates and percentages are given for only those races that are represented by a fair number of cases.

to draw conclusions from these figures as to the relative susceptibility to cancer of each individual race, as the total number of cases for the various individual races is too small to warrant their trustworthy use for this purpose. However, a few races and race-groups are represented by a sufficiently large number of cases upon which to base such conclusions, at least in a broad way. It is seen that the Irish show the greatest cancer rate, namely, 6.40 times that of the native born. The Germans come next, with a rate 5.50 times that of the native born. The English and Scotch show a rate of 4.27 and 4.54 respectively. The lowest rate shown by any race, excluding the Poles, for reasons mentioned below, is that of 1.93 for the Italians, though the figures upon which this rate is based are too small to be more than suggestive.

In considering race groups we have united the Germans and Poles, as there is no satisfactory method of accurately separating them, for the reason that most of the Poles in Buffalo come from German Poland and give their nationality indifferently as German or Polish. Moreover, there are many characteristics of life common to both peoples. The Germans and Poles together, then, show a cancer rate 4.81 times that of the native born as compared with a rate of 4.31 for all foreigners except Germans and Poles. The Germans and Poles, therefore, show a rate in excess of all other foreigners, as a class, and are exceeded only by the Irish, who show the highest rate, namely, 6.40.

The general conclusions, then, are as follows: The foreign-born population of Buffalo shows a cancer rate several times greater than that of the native born, and of the different nationalities the Irish seem to have the highest rate, the Germans and Poles the next highest rate, and the Italians the lowest rate.

In corroboration of the high cancer rate in the foreign born as compared with the native born, shown by the Buffalo statistics, the following table, modified from the United States census, is shown:

TABLE FROM THE U. S. CENSUS.

Showing for 28 cities in the United States the death-rates for cancer and tumor during the census year 1890, by general nativity per 100,000 of corresponding population, and for 18 of these cities the additional distinction of certain birthplaces of mothers.

28 cities in the United States.	Aggre- gate.	Total.	White.				Colored	Birthplaces of mothers (18 cities).		
			Native born.			Foreign born.		United States (white).	Ireland	Ger- many.
			Total.	Both parents native.	One or both parents foreign.					
Total	52.99	53.60	31.12	52.32	17.41	99.23	41.01	39.83	65.40	59.83

This table shows that for twenty-eight large cities in the United States in 1890 the mortality from cancer and tumor per 100,000 of corresponding population was 31.12 for those of native birth and 99.23 for those of foreign birth, or a rate for foreigners 3.18 times that for native born. [It also shows the remarkable and inexplicable fact that among those who were born in the United States cancer is more than 3 times more frequent in those whose parents were also native born than in those whose parents, one or both, were foreign born!] The United States census of 1890 unfortunately did not classify its mortality statistics by the birthplace of the deceased, but by the birthplace of the mother of the deceased, and there is no way of determining for a given class whose mothers were born in a certain foreign country how many of such class were born in the country of mother's birth and how many were born in the United States from such mothers. However, in so far as the mother's birthplace is a guide to the birthplace of a certain proportion of a given class, and thus of the class, the above table confirms our Buffalo statistics by indicating that the Irish show a somewhat higher cancer rate than the Germans, both showing very high rates.

We have made no distinction between blacks and whites in our statistics for Buffalo, as the colored population is so small as to be insignificant.

In considering the high cancer rates of the foreign born we must take account of the fact that the average age and the age-periods of the foreign born are considerably higher than those of the native born, for cancer is a disease occurring chiefly after middle life. The amount of correction in the high cancer rates of the foreign born on this account cannot be estimated,¹ but that it must be considerable is evident. However, it seems highly improbable that this factor could account for more than a fair share of the very high rates in the foreign born when we consider that the foreign born in Buffalo show 4.59 times the cancer rate of the native born, and that in the twenty-eight cities of the above table the corresponding rate is 3.18. We apparently have, then, a real and absolute preponderance of cancer in the foreign born over the rate in the native born. Moreover, the rates in the foreign-born immigrants (after ample deduction for age influence) are much higher than the rates of the same nationalities in their own countries, as published in the official mortality reports of such foreign countries. [No striking difference in the general cancer rates of Germany, Great Britain, and the United States is shown in the official mortality records of these countries.] It is thus shown that cancer claims not only a vastly higher percentage of victims among the foreign-born immigrants in the United States than among the native born, but that such immigrants show a

¹ The best method of comparison of the native-born and foreign-born rates, taking account of age differences, would be by determining for each class the rate of cancer per 100,000 of corresponding population for each age period.

similar great increase over the general rates of their kinsmen in the foreign countries from which they emigrated.

The figures and rates above given emphasize the importance of the general facts pointed out. The explanation of these facts is not simple. There are those, doubtless, who would argue that these facts could be brought into harmony with the embryonic theory of the origin of cancer by supposing that foreign immigrants, owing to the hardships of life in a new country, exhaust their vitality and subject their organs to degenerative changes, thus laying the foundation for the growth of the hypothetical misplaced embryonic cells which develop into cancer. But such an explanation seems strained and improbable, and cannot be left unchallenged. How much more probable seems the explanation that cancer is an infectious disease, and, like many other infectious diseases, claims its victims in increased ratio among those who, by the exigencies of life in the struggle against natural obstacles in a new country, are most exposed to infection.

The high cancer rate of the Germans and Poles confirms the concentration shown by the map in the German and Polish wards. The low rate among Italians also agrees with the relative freedom of the Italian quarter from cancer shown on the map.

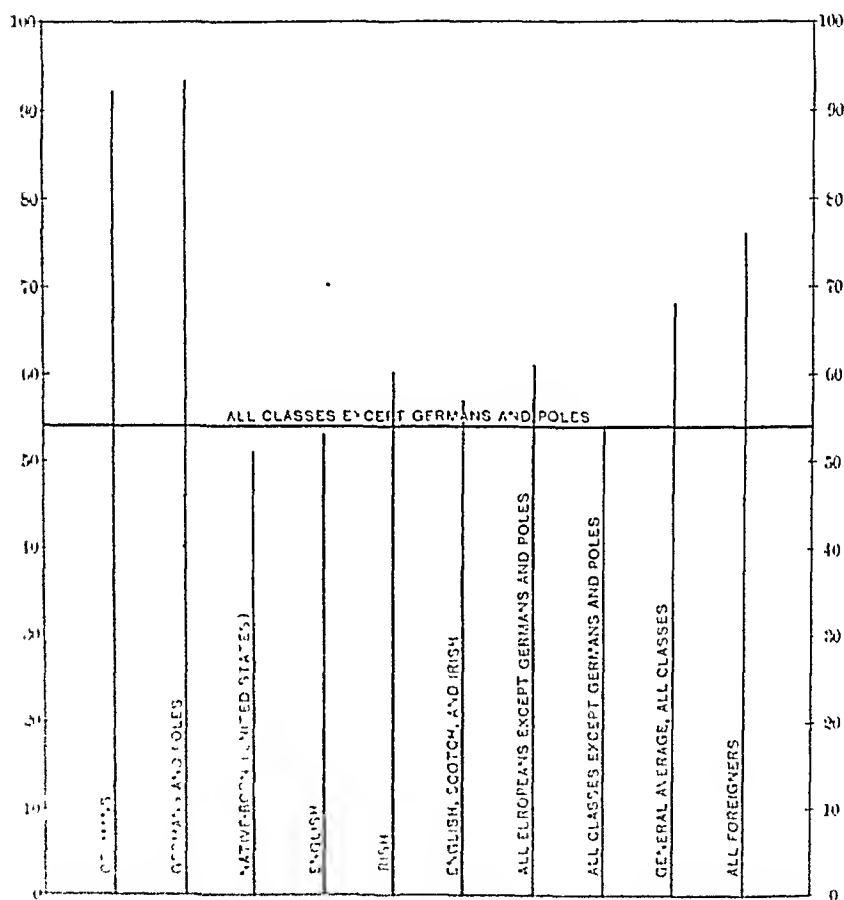
Age Distribution. The age distribution for the 2299 cases of malignant disease is shown in Table V. Nothing new is shown by this table. The well-known infrequency of cancer in the early decades of life is shown. The first decade shows a higher mortality than the second, due to the greater frequency of sarcoma in the earliest years of life. The greatest mortality occurs during and after middle life, 52 per cent. of the cases occurring in the sixth and seventh decades and 70 per cent. in the fifth, sixth, and seventh decades. The mortality rate from cancer increases after middle life for each succeeding decade, though the absolute number of cases diminishes after the sixth and seventh decades, due to the smaller number of persons living to these advanced age-periods.

TABLE V.
Age distribution.

Age.	Male.	Female.	Both.	
0 to 9 years	12	6	18	
10 " 19 "	1	5	6	
20 " 29 "	25	19	44	
30 " 39 "	60	131	191	
40 " 49 "	152	275	427	
50 " 59 "	252	357	609	18 per cent. }
60 " 69 "	265	372	637	26 " }
70 " 79 "	141	181	322	13 " }
80 " 89 "	28	39	67	
90 " 99 "	1	3	4	
Not stated	0	1	1	
Total	938	1361	2299	

Sex Distribution. Table IV. shows the sex distribution of the 2299 cases of malignant disease generally and for each important race and race-group. Fig. 2 represents graphically for the entire period the number of males to females, the latter taken as 100, for several races and classes of the population. A remarkable difference of sex proportion is thus shown between the Germans and Poles, on the one hand, and all other classes of the population, on the other. The Germans

FIG. 2.



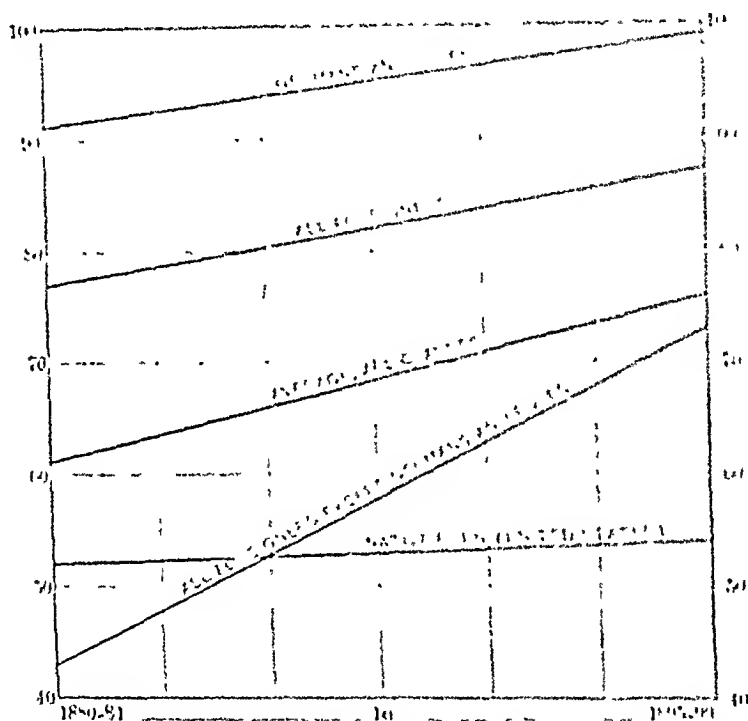
showing the male to female mortality, the latter taken as 100, from malignant disease for different classes of the population in Buffalo for the period 1880-1909.

and Poles stand, as a class by themselves, apart from all other nationalities in showing a male rate closely approximating the female rate—92:100. All other nationalities show a much lower male rate, ranging from a minimum of 51:100 for the native born to a maximum of 61:100 for all Europeans exclusive of Germans and Poles. The common text-book statement that cancer is twice as frequent in females as

in males is thus confirmed for the native born (51 : 100), and is approximately correct for every other class except Germans and Poles.

As the United States census of 1890 did not classify its mortality statistics by race, it is not possible to make a comparison of the sex ratios of the different races for Buffalo and the United States as a whole, and this can be done only for the two general classes of population, the native born and the foreign born. For these general classes the ratios closely agree for Buffalo and for the United States, as follows: Native born, Buffalo, 51 : 100; United States, 53 : 100; foreign born, Buffalo, 77 : 100; United States, 79 : 100.

FIG. 3



Showing the increasing proportion of male to female mortality, the latter taken as 100, from malignant diseases for different classes of the population in Buffalo, from the period 1880-1881 to the period 1895-1899.

We can find only one satisfactory explanation of the very high male rate in the Germans and Poles above other classes in the fact that cancer of the stomach, which is more common in males than in females, is particularly frequent in Germans and Poles, whereas cancer of the uterus and breast in females is much less frequent among Germans and Poles than among the native born (see *Anatomical Distribution*). The correlation of these factors with the sex ratio of cancer is apparent. That the peculiarly high male cancer rate in the Germans and Poles is not dependent upon a preponderance of males in these races in Buffalo is rendered very probable by the fact that though the Germans and

Poles constitute 57.5 per cent. of all foreigners in Buffalo, the proportion of males in the foreign-born population of Buffalo (51.38 per cent.) is almost identical with the proportion of males in the entire population of the United States (51.21 per cent.).

Fig. 3 shows the increasing ratio of male to female mortality for different races from 1880-84 to 1895-99. An actual increase in the male rate is shown for each class. The increase is marked for all foreigners, and so slight as to be almost insignificant for the native born. An increasing male rate has been noted generally in European countries, and has been attributed to increasing frequency of cancer of the stomach and internal organs in males. The very slight increase in the male rate in the native born in Buffalo probably indicates that there has been little relative increase of cancer of the stomach in the native born.

Anatomical Distribution. Table VI. includes a general classification of all malignant cases according to their general variety and according to whether or not the anatomical location was stated in those classed as cancer. The term cancer, as here used, includes only carcinoma and epithelioma. Table VII. shows the anatomical distribution by organs of all cases of cancer in which the site was stated, separately for all classes combined, for those born in the United States and for those born in Germany (and Poland).

TABLE VI.

(Classification of cases of malignant disease according to general variety, etc.

	1880-1889.		1890-1899.		1880-1899.		Both
	Male	Female	Male	Female	Male	Female	
Cancer, anatomical location stated	191	206	526	760	717	1066	1783
Cancer, anatomical location not stated	100	150	23	57	123	207	330
Malignant tumor, variety not stated	16	21	19	22	35	43	78
Sarcoma	7	7	56	38	63	45	108
Total	311	481	621	877	938	1361	2299
Total	798		1501		2299		

The striking facts shown by Table VII. are the high rate of cancer of the stomach in the Germans and Poles (43.8 per cent.) compared with those of native birth (21 per cent.), and, on the other hand, the low rate of cancer of the uterus and breast in females born in Germany and Poland (34.4 per cent.) compared with females born in the United States (61.6 per cent.). The correlation of these factors with the sex ratio of cancer for the two races has already been noted. As the sex ratio of cancer for Germans and Poles differs widely from that for all other nationalities, it is probable that other foreign races in general

TABLE VII.
Anatomical location in cases in which the location was specified.

Organs involved.			All races.			Native born (United States).			Germans and Poles.		
			Males.	Females.	Both.	Males.	Females.	Both.	Males.	Females.	Both.
Genital organs	{ male { female { other		1.3	33.0 { 31.7 1.7	19.7 { 20.7 1.0	0.5 2.0 .....	..... 11.6 { 17.6 2.9	0.6 39.7 { 32.8 2.6	0.5 ..... .....	..... 23.5 { 21.5 0.9	0.2 12.1 { 12.9 0.5
Breast			0.5	11.5	8.9	0.6	17.0	10.9	0.8	10.9	6.1
Urinary organs	{ kidney { bladder		0.1 { 2.2 1.8	0.6 { 1.3 0.6	0.5 { 1.6 1.1	0.6 { 2.0 1.3	0.0 { 0.5 0.5	0.2 { 1.0 0.8	0.2 { 1.9 1.6	0.2 { 0.9 0.7	0.2 { 1.1 1.1
Upper alimentary canal	{ mouth { tongue { jaws { throat		0.8 { 2.3 2.5 { 1.0	0.1 { 0.2 0.2 { 0.7	0.1 { 1.1 1.3 { 2.0	0.6 { 11.3 3.3 { 3.3	0.0 { 0.2 0.2 { 0.5	0.2 { 1.1 1.5 { 1.1	0.2 { 0.8 1.6 { 1.6	0.2 { 0.9 0.7 { 2.6	0.2 { 1.0 0.7 { 2.6
Middle alimentary canal	{ esophagus { stomach		4.1 { 17.6 12.6	25.5 { 25.5 0.5	1.7 { 36.1 31.3	2.6 { 10.0 37.3	0.0 { 13.7 13.7	0.8 { 21.9 21.0	6.0 { 28.9 22.8	0.2 { 23.9 23.7	3.0 { 16.8 12.8
Lower alimentary canal	{ intestine { rectum		5.1 { 12.1 7.2	3.8 { 8.1 1.3	1.3 { 9.8 8.1	6.6 { 18.6 12.0	2.6 { 6.8 1.1	3.2 { 10.5 6.6	1.1 { 8.9 3.5	5.1 { 8.9 3.1	1.7 { 9.3 1.1
Abdominal organs (not otherwise included)	{ liver { other		12.1 { 17.9 5.8	11.6 { 15.7 4.1	11.8 { 18.6 1.8	12.0 { 19.3 9.3	8.6 { 13.4 1.7	2.7 { 15.9 6.1	11.8 { 18.6 15.1	13.3 { 18.8 5.1	12.6 { 17.7 5.0
Thoracic organs	{ heart { lung		0.0 { 0.1 0.1	0.0 { 0.6 0.5	0.0 { 0.5 0.5	.....	0.0 { 1.1 1.1	0.0 { 1.0 1.0	0.0 { 0.5 0.5	.....	0.0 { 0.2 0.2
Head and face			5.1	1.5	3.0	6.6	1.1	2.8	1.1	1.7	2.8
Neck			3.6	0.2	1.6	2.0	.....	0.6	3.5	0.4	1.9
Extremities			1.5	0.5	0.9	5.3	0.5	1.4	1.3	0.7	1.0
Other locations			.....	0.1	0.2	.....	1.1	0.8	.....	.....	.....
Total organs involved			767	1121	1858	162	332	511	384	139	504
Total number of cases			717	1056	1753	170	331	181	263	165	766

may be classed with the native born, as opposed to the Germans and Poles, in showing also a low rate of cancer of the stomach and a high rate of cancer of the uterus and breast. This is probable, but cannot be positively affirmed, as the total number of each other foreign race in our statistics is not sufficiently large to warrant us in making tables of anatomical distribution by race and in drawing conclusions from them.

The Germans and Poles, then, stand out in sharp contrast with the native born and probably other foreigners in showing a remarkably high rate of stomach involvement and a correspondingly low rate of involvement of the uterus and breast. Cancer of the stomach relatively to cancer of the other organs was 2.08 times more frequent among Germans and Poles (43.8 per cent.) than Americans (21 per cent.). As cancer in general was 4.81 times more frequent in Germans and Poles than Americans (see above), cancer of the stomach was therefore 10¹ times more frequent in a given number of Germans and Poles than in the same number of Americans in the city of Buffalo.

Such a relative frequency of cancer of the stomach in the Germans (and Poles) compared with the Americans is remarkable and requires a careful investigation of its cause. As the United States census of 1890 did not classify by races (birthplace) we are unable to compare the high rate of stomach involvement in the Germans in Buffalo with the rate for the Germans in other American cities. We have also been unsuccessful in our efforts to obtain official German statistics, and thus to compare the rate of cancer of the stomach for Germans in Buffalo with the rate for Germans in Germany. A careful personal search at the Surgeon-General's Library in Washington for such statistics proved fruitless. We are therefore left to deal with the rates for Buffalo only, unable to compare them with the rates for other American cities and for Germany. It seems probable, however, that a high rate of cancer of the stomach in Germans will be shown generally, wherever statistics may become available. A high rate of stomach involvement is shown by both males and females among the Germans, indicating the participation of each sex in the conditions operating to elect the stomach as the seat of invasion by the cancerous process. The male, however, always predominates in all races in the rate of stomach involvement in cancer.

What significance has the remarkable frequency of cancer of the stomach among Germans in the question of the nature and origin of cancer? The coarseness and quantity of the German's diet could be claimed, perhaps, to account for some increase of stomach involvement on the embryonic theory, but these simple factors seem most insuf-

¹ As the rate 184 is subject to some reduction on account of the higher average age of the foreign born than the native born (see above) so also the rate 10 must be proportionately reduced for the same reason.

ficient to explain the high figures that we have shown. The parasitic theory here again seems to harmonize best with the facts. Does it not seem likely that the stomach is the seat of cancer invasion because it is directly infected by contaminated food, and that the peculiar diet of the Germans is more subject to such contamination than the food of Americans or other people? In this connection it is well to recall the observations of Behla, at Luckan, and the suspicion that he entertained against raw, uncooked garden vegetables as the carrier of cancer infection. In the cancer suburb of Luckan also, as well as among the Germans dying of cancer in Buffalo, cancer of the stomach and liver predominated. The apparent relation at Luckan between cancer and the location of a foul ditch is lacking in Buffalo to account for the contamination of the garden vegetables.

If the German's stomach is far more exposed to infection than other organs, we have at least a partial explanation of the low rate of cancer of the uterus and breast in Germans. The lower rate of cancer of the uterus and breast in German than in American women seems to us to be a weighty argument against the embryonic theory, as it is well known that the birth-rate and habit of nursing at the breast are greater among the Germans than the native born, and, therefore, if the embryonic theory were correct, cancer ought to be more frequent rather than less frequent in these organs in Germans because of their relatively greater use and exhaustion. The reverse is shown to be the fact.

The special facts that we have found in the peculiar cancer distribution in Buffalo may be due partly to local conditions that may not be found entirely similar in other American cities and towns, and hence it may be that the special relations of cancer to race, sex, etc., found to exist in Buffalo may not be entirely confirmed elsewhere. It seems likely, however, that the general result of our study in Buffalo will be confirmed, in the main, in other American cities in which the conditions of population, race, social status, etc., are generally similar to those existing in Buffalo. Special conditions will undoubtedly be found in each city that will determine the special local peculiarities of cancer distribution, and we believe that the labor and time spent in studying the local conditions influencing cancer distribution in different places will be repaid by results commensurate with the task involved and possibly of great import to the successful direction of the attack against the cause of this scourge of humanity.

In conclusion, lest we may have been misunderstood, may we make clear that we have regarded Behla's theory of infection through contaminated raw vegetables not as a truth which we accepted, but merely as an interesting hypothesis, possibility, or suggestion worthy of consideration in speculating upon the cause of the peculiar cancer distribution and remarkable frequency of stomach involvement shown by the

Germans? In fact, we are far from assuming the truth even of the parasitic origin of cancer until further and more convincing evidence than hitherto adduced is brought to sustain it. So many possibilities of error in fact and judgment may enter into a problem so difficult and complex as this that our attitude should be one of conservatism and caution toward all claims and theories until they are supported by unimpeachable testimony and evidence that compel conviction. On the other hand, let us not confuse prejudice with just conservatism or refuse to give our attention to new possibilities that offer even a hope of solving a problem that has baffled solution on any of the other theories. It is in this spirit that we offer the evidence that we have been able to collect, as a mere contribution to the question of the nature of cancer—tending, we are inclined to think, to support the theory of parasitic origin.

Summary. We may briefly summarize the principal facts and results of our study as follows:

1. The house distribution of cancer on the map shows an area of marked concentration in the German wards. No other relation than that of race can be determined to exist between this area of concentration and local conditions.

2. That there is a real relation between this local concentration and race (German) is further indicated by the race table, which shows that cancer is many times more frequent among the foreign born, and particularly the Germans, than the native born. The latter fact is also verified by the United States census for twenty-eight large cities. The cancer rate of foreigners in general in Buffalo was 4.59 times the rate for the native born, and the corresponding rate for Germans (and Poles) was 4.81.

3. The Germans (and Poles) were further specially distinguished from other classes by the high rate (43.8 per cent.) of involvement of the stomach, 2.08 times the rate (21 per cent.) shown by the native born. Cancer of the stomach, therefore, was 10 times more frequent in the Germans (and Poles) than in the native born in Buffalo, for equal numbers of each. Such high figures seem hard to explain on the embryonic theory, and tend to support the parasitic theory of cancer by supposing that the peculiar diet of the Germans is more liable to contamination with the parasite of cancer than the more ordinary diet of other classes. Cancer of the uterus and breast in Germans (and Poles) was correspondingly low, being hardly more than half as frequent as in the native born. This fact seems to be a further argument for the parasitic as opposed to the embryonic theory, considering the facts that the birth-rate and the habit of nursing at the breast (conditions predisposing to degeneration of these organs) are greater among German than native-born women.

4. The ratio of males to females, the latter taken as 100, was 93 for Germans (and Poles) and from 51 (native born) to 61 (all Europeans except Germans and Poles) for all other races and classes. The high German male rate is probably directly dependent upon the high rate of cancer of the stomach (especially in males) and the low rate of cancer of the uterus and breast (females) found to characterize the German as opposed to other races.

For all classes the ratio of males to females was found to have risen during the twenty years covered by the investigation. This rise was very slight for the native born.

5. An increase in the general cancer rate from 32 to 53 per 100,000 of population (65 per cent.) took place from 1880 to 1899. A similar increase has been shown in all countries. This increase is partly real and not entirely apparent. The rate of increase is shown to depend, in part at least, upon changes in the proportion of the foreign born, because the cancer rate in the foreign born is so much higher than in the native born.

CHRONIC MYOCARDITIS AND FATTY DEGENERATION OF THE HEART.

By BEVERLEY ROBINSON, M.D.,
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CLINICALLY these two expressions of cardiac degeneration are frequently most difficult to differentiate accurately. We have our suspicions based upon a fair interpretation of the case as a whole, and sometimes the results of the autopsy justify our probable diagnosis. Many times we believe we shall find not merely fibroid changes or, indeed, simple fatty degeneration, but there will be a combination of both changes. In the advanced forms of fatty change particularly, and whenever we have in the history of the patient efficient causation of such alteration, our belief in its existence is very positive. There are, however, numerous instances in which our diagnosis during life is at best very problematical, and yet it seems to me any other diagnosis of what we observe falls short of seeming truth and is at best somewhat unsatisfactory to the practitioner. While we know, for example, in the graver forms of anemia, and notably in the so-called pernicious form, fatty degeneration of heart muscle is no uncommon finding, I do not believe that physicians are apt to consider that the heart may be structurally affected in the simpler forms.

It is true that many symptoms point to cardiac weakness. Notably we would put emphasis on lowness of the heart sounds at times, on extreme rapidity of its beats, with sensations of fluttering and cardiac

distress. Sometimes there is a systolic murmur which covers in part or wholly the normal sound. Frequently this is absent. Attacks of dizziness or faintness may come on readily and repeat themselves with little or no sufficient cause. I have seen such an attack where the patient was unconscious for a period of half an hour or more. During this period the pulse was very faint, sometimes almost imperceptible at the wrist. There was occasionally a lapse of pulsations at the wrist for one or two cardiac beats, accompanied with marked irregularity. The extremities were cold, the respiration shallow and suspirious. After such attacks and when the patient's strength had partially returned there was no enlargement of the heart which could be discovered, no abnormal pulsations either on the chest or in the neck, and no venous hum in the jugulars.

I am of the opinion to-day that such cases often mean beginning cardiac degeneration of the fatty type, and that any other interpretation inadequately expresses the best medical judgment. Of course, they require iron and arsenic to re-establish the blood condition. They are also temporarily benefited at times by the use of intestinal antiseptics; still, in order to bridge over the acute attacks we must give cardiac stimulants freely and repeatedly and aid with the heart tonics of strophanthus and strychnine judiciously administered. Oxygen also given systematically is of great help and must be insisted upon.

We all feel we know the usual gouty heart fairly well, viz., the heart affected with moderate hypertrophy of the left ventricle and adjoined to evidences of more or less fibroid changes in the kidney and general arterio-capillary circulation. Whenever this hypertrophy is no longer thoroughly compensatory and evidences of heart weakness develop, as shown by local and general signs and symptoms, we are frequently brought to the position of asking ourselves whether cardiac degeneration be present, and if so, its extent, variety, and nature.

Our diagnosis must be determined by several considerations independently, perhaps, of the underlying and evident gouty changes. It may be that the patient has been a free liver, is of corpulent frame, and has indulged more or less and for a considerable time in the use of alcoholic stimulants.

These conditions would tend to make us reasonably sure of the presence of some fatty degeneration of muscular fibre. The condition also of the liver, notably where it is torpid and enlarged and there is possibly some additional abdominal enlargement, with tension of the parietes, would make us suspect cirrhotic and fatty changes in this organ. The presence of ascites may remain doubtful for weeks and months, and never, indeed, be accurately determined. Again, in a relatively short period succussion and palpation may unquestionably reveal abdominal effusion in small or moderate quantity. In these

instances the pulse may never have increased tension, or only to such slight degree that our tactile sensations, or even the use of the sphygmograph, may not corroborate our suspicions, but simply leave us in reasonable doubt. Here, again, it is the skilful touch, the keen appreciation of local changes which proceeds from long, careful experience, or the expert and, may be, repeated use of the sphygmograph which shall solve our difficulty. In any event, but particularly where our findings are positive, we believe that we shall detect an excess of fibroid tissue in the heart in certain spots between atrophied, compressed, or degenerated fibres.

The cerebral symptoms, which may be passing or more or less permanent, while pointing to cardiac degeneration, do not tell us positively whether the fibroid changes or fatty ones are predominant. If the mental activity of the patient has failed slowly and evidently for many months, if the memory be impaired, somnolence increasing, and even slight mental exertion be accompanied by great fatigue, slowness and difficulty of speech and obvious lethargy, we are inclined to the opinion of marked fatty degeneration, always supposing the other signs and symptoms mentioned are present. If now the arterial tension remains high the coats are visibly thickened, knotty, tortuous, giving proof of decided atheromatous changes, we are prone to believe that the intracardiac condition will be more likely that of chronic myocarditis, with marked fibroid changes. Any calcification of the arteries, as of the radial or temporal, will only accentuate and confirm this judgment.

This condition we should not find except in very rare instances, unless the patient were one already of advanced years or the gouty dyscrasia were intense and of hereditary origin increased by bad habits of life, speaking mainly from the hygienic stand-point.

In some instances we are led to believe that on autopsy we should find the coronary arteries notably affected. These examples are especially those in which precordial pain and anxiety had been evident at times and with moderate or great intensity.

I saw a patient, not long ago, a professional man, about fifty-five years old, who gave the following history: He had been a careful liver so far as food and alcohol were concerned, but had for many years smoked immoderately and kept late and irregular hours. He had done much hard work in active professional life and in a literary way. He had for many years been a chronic dyspeptic, showing itself by slowness and impairment of digestion, belching of wind, and capricious appetite. He had never suffered from symptoms of heart weakness or distress. Calling to see him, I found him pacing the floor, with marked dyspnoea, precordial distress and great mental anxiety, and the feeling of impending disaster. The hands were cold and the face blanched; the pulse was regular and tolerably full; the radial arteries were thickened and there was apparently increased tension; the heart was enlarged, showing hypertrophous dilatation, moderate in amount. This

attack had lasted twelve hours without relief spontaneously, and was increasing in intensity, as shown by the augmented distress. The swallowing of numerous soda-mint tablets, which frequently gave relief to simple dyspeptic conditions, were of no avail.

I prescribed immediately a heart tablet of strophanthus, digitalis, atropine, and nitroglycerin, and in a few hours there was great relief. The urine during the attack was high-colored and concentrated, but contained neither albumin nor sugar. In a few days he was about as usual. I advised repose from work and careful dietary, with the use of cardiac stimulation if required. In a short while he was better than he had been in many months and had had no recurrence of his anginous symptoms.

No doubt, to my mind, this patient has intracardiac changes, probably of the fibroid type. It is probable also that his coronary circulation is defective and that endarteritis is present. Did he have some temporary and incomplete obstruction of one or other of these arterial branches at the time of his attack? This I believe, although I cannot affirm it. I only know that no other diagnosis is sufficient to explain his symptoms satisfactorily. Probably the causes enumerated were all more or less contributory to the development of the attack. Judging by the sequence of events, I believe that nervous tone to the heart was partially restored by relative rest from work and that the stomachal condition was improved by appropriate dietary. The use of the cardiac tablets during the attack certainly gave marked relief and possibly prevented a fatal termination due to complete clogging of one or both main arterial coronary branches.

I have known of the case of another professional man, about fifty years of age, whose habits were not different from those of many tolerably successful ones at this period residing in a large city. He worked moderately, but not unduly; he ate and drank with proper selection and due regard for his habits and peculiarities; he gave himself a fair amount of recreation, took long summer vacations, and was fond of the water and yachting. At times he had very slight attacks of dyspnea and precordial anxiety, which never meant absolute pain or great distress; indeed, these mild attacks occurred at infrequent intervals and disappeared spontaneously and in a few minutes or hours at most. One afternoon, hastening home from his boat on the river to dine and meet his wife, who was anxiously awaiting him, as he was late, he had an attack of severe angina pectoris and died suddenly in the street.

The following description of the cardiac changes found at the autopsy is copied textually from notes kindly given me by the pathologist:

Moderate degree of hypertrophy of left ventricle. Valves competent. Atheroma in mitral valve and in beginning of aorta. In latter situation this is most abundant about origin of coronary arteries, whose lumen is distinctly encroached upon by it. On opening of coronary arteries atheroma is found in their walls extensively beyond their origin. In this way their calibre is considerably narrowed. Microscopical examination of heart muscle reveals increase in pigment in cells about

nuclei and a slightly granular condition of muscle-cells generally, but no distinct fat. There is no obscuration of transverse striae and there is *no increase in fibrous tissue.*¹

Analogous instances to this are not infrequently met with. Of course, the precise nature and the degree or intensity of the signs and symptoms experienced during life vary greatly. In a similar manner the rapidity or suddenness of the fatal termination, if it occur, varies also very much. Whenever the coronary circulation is immediately and wholly obstructed sudden death takes place and one of several findings is evident at the autopsy. It may be that the coronary artery is filled up with an embolic plug, which has its origin in the heart either from a cardiac thrombus or from a detached portion of vegetation from a diseased valve or cusp of the mitral or aorta. In such cases the coronary arteries may be relatively free of disease, although frequently there may be even here a concomitant condition showing local degeneration, though slight in amount. Wherever—and this occurrence is much more usual—the coronary arteries themselves are more diseased, showing inflammation, thickening—endarteritis, in other words—or pronounced atheroma, with possible calcification at certain points, they are occluded with a thrombus.

The arteries may be occasionally affected and narrowed mainly or entirely at their orifices, or, what is truer ordinarily, the coronary arteries are thickened, tortuous, atheromatous, or calcified throughout the larger portion of their distribution. These changes have, of course, greatly decreased their lumen or the extent of their calibre internally, so that the heart has been imperfectly nourished by an insufficient blood-supply for a long period, and at a given moment a thrombus forms locally and almost inevitably, and a fatal result ensues, although, of course, in a somewhat less rapid manner than if an embolus has been the immediate and efficient cause of death.

The local changes of the heart muscle in these latter cases particularly partake of a fatty or fibroid character and are more or less localized or disseminated in their distribution, according to modifying general conditions. Moreover, the time during which the changes have taken place and the age of the patient have much to do with the character of these changes. As I have already pointed out, it is almost impossible prior to death and direct examination of the heart to state positively just what shall be found, so far as the precise changes or the limitations of the morbid involvement of the coronary arteries and heart muscle are concerned.

In old valvular troubles of the heart, whether they be of the nature of stenosis or regurgitation, in chronic pericarditis where the adhesions

¹ The findings at autopsy are here unusual, in that there was no occluding thrombus and the muscle changes are slight.

are tough and fibrous, in an advanced condition of hypertrophy of the heart, with probably much cardiac dilatation, fatty degeneration is almost surely going to occur at a given time, provided the patient's life is sufficiently prolonged; then, of course, notable cardiac weakness, præcordial distress and dyspnœa, cyanosis, infiltration of the lower limbs, weak, unequal, and irregular pulse, deficient and concentrated urinary secretion, are some of the numerous painful phenomena with which we are all familiar.

In these cases we naturally expect and usually find post-mortem far more disseminated degenerative changes of the heart muscle than we do in the instances previously cited. As a rule, the left ventricle, and more particularly the portion of it near the septum, is specially affected. The columnæ carneæ—the papillary muscles—are frequently reduced in size, changed in color, soft to the touch, possibly giving a greasy feel, easily torn or lacerated, and showing to the naked eye indubitable evidences of fatty degeneration which microscopical investigation will merely serve to reaffirm.

The right ventricle may also be degenerated in parts, although less frequently, and it is now known that the auricles are sometimes in a certain degree degenerated, although this statement was formerly denied.

If there be chronic myocarditis present, which occasionally occurs, the heart muscle is hard and resistant in spots and very often diminished in thickness where this exists, owing to the deposit of fibrous tissue which has practically caused many muscular fibres to atrophy, degenerate, or almost or completely to disappear.

In those corpulent people who have accumulated flesh continuously, slowly, and in large amount, the heart is no exception to the great number of viscera which become more or less involved. The deposit of fat upon and around the heart usually seeks at first those regions where fat is deposited to some extent normally, and particularly in the grooves between the auricles and ventricles and along and over the intraventricular septum. Later, it is no uncommon finding to discover fat under the epicardium or the endocardium. Whenever this occurs the fatty infiltration has extended deeply into the heart muscle and between the muscular fibres to such an extent that the force of the heart-beats is notably lessened, and many of the phenomena which characterize true fatty degeneration of the cardiac muscle are present during life. Not a very long time passes under these circumstances, unless treatment is effective in checking the accumulation of fat in the tissues, until the fat deposited penetrates the muscular fibres themselves and produces true fatty degeneration of the heart.

These obese persons are, therefore, always a source of special solicitude to us when we take care of them in any of their ills. All acute

diseases in their instance are of moment, and what would be a relatively simple affair with a thin person or one with only moderate or healthful embonpoint is apt to take on a certain degree of gravity. A slight bronchitis, an attack of influenza, a mild rheumatic seizure, or a limited attack of acute pleurisy will almost invariably lessen their bodily strength very rapidly, and soon their respirations are much quickened, their pulse becomes rapid and weak, and their cardiac action so feeble as to require immediate and frequent stimulation. The only way to treat such patients safely is to suppress all bodily exertion as much as possible for a time and to lessen, if feasible, their mental cares and anxieties. Even without any marked febrile movement they should be put to bed and kept there until the acute attack, whatever it be, has completely passed, during several days at least. Of course, if there be marked febrile reaction the urgency and necessity of this action on the part of the attending physician is even far more imperative; and here it is well to remark that in such cases, as frequently the rise of temperature is often only slight or moderate, the patient's immediate and nearest relatives are not at all alarmed, and not infrequently consider the wise and careful, conscientious physician a great alarmist when he is merely obeying his best judgment if he insists absolutely upon the importance of following out strictly his orders.

At first in some of these cases, and leaving out attacks of acute trouble for the while, the careful examination of the heart physically will not permit us to affirm that there is any notable cardiac enlargement; and even the heart sounds, when the patient is in his usual health and free from physical exertion and not harassed with business or other cares, will not show any special weakness, irregularity, or notable murmurs; but often very slight exertion—as going up stairs, climbing a hill, hastening, even an ordinary walk on level ground—causes distress, and they will be in a putting condition almost immediately, become dizzy and faint, and the face is suffused with an undue pallor or else their cheeks and eyes are congested and their lips are blue and cyanosed. These cases we all see—we meet them every day—and often, I am sorry to say, do not guide and direct them intelligently.

If the person affected with obesity is young I do not believe, as a rule, that the immediate outlook of the case from a cardiac stand-point has usually much gravity; and yet even then we must not ignore the possible outcome and the danger of dilatation of the heart resulting—more or less lasting and important—unless we insist upon proper dietary, exercises, and judicious medication. But in women, near the climacteric especially, and in men near or past middle life, we cannot be too formal about our protests to be careful and heed judicious medical counsels; otherwise we shall have soon to deplore an evident cardiac

enlargement and dilatation, which from a prognostic stand-point is certainly very grave, as the underlying cause is often fatty degeneration of cardiac muscular fibre, and in view of the age and condition of the patient is very difficult, not to say impossible, to remove.

In young girls, particularly, obesity is apt to follow acute disease like scarlet fever or typhoid and to be allied with chlorosis. This anæmia is sometimes corrected by proper treatment without too great lapse of time; again, it is most persistent and resists all our efforts for months and years. During this period such girls are liable to syncopal attacks and other symptoms which surely indicate pronounced cardiac weakness and cause much distress and anxiety to all concerned—patient, relatives, and physician. In older patients the blood may be of relatively good quality and not seemingly add to the distressing or merely uncomfortable symptoms.

In some women who have profuse menstruation; in those who are married and have had several children; in women at the time of the menopause—the amount of blood often lost at the monthly flow is excessive, and the result is that the bodily strength is greatly diminished and the blood examination shows great diminution in hæmoglobin and the number and appearance of the red cells.

Here, again, I have no doubt that the anæmia thus produced hastens considerably fatty degeneration of heart muscle and the subsequent development of cardiac dilatation. In these instances, if for some reason the patient is obliged to submit to an operation and take an anæsthetic, of course the attending physician, surgeon, and, above all, the giver of ether or chloroform or even nitrous oxide should be particularly careful. In uterine fibroids which require operation I would urge more than ordinary solicitude in administering anæsthetics, and especially in corpulent women about middle age. These women are affected with several conditions which are apt to produce fatty degeneration of the heart. It may be that prior to the operation the heart had been thoroughly examined and was declared competent and probably free from more than a considerable degree of fatty infiltration, making part, as it were, of the increased fatty accumulation in the body not only in the cellular tissue under the skin, but also of several of the other viscera. During the course of the anæsthesia, however, and subsequent also to the operation, general phenomena of cardiac weakness showed themselves, which, without doubt, at times hastened or, indeed, occasioned the fatal ending of the case.

Whether under these circumstances, as in one unfortunate case I have in mind, the cardiac failure would at all explain the rise of temperature and local evidences of peritonitis which developed, or whether these latter phenomena were merely due to some imperfection in the operative technique, or, indeed, to penetration and absorption of septic

material in the abdominal cavity, I am not wholly convinced. What we do know is this, viz., when a sudden and great loss of blood occurs, accompanying the severe shock to the nervous system, and indeed the whole organism, inseparable often from the results of a very severe operation, conditions arise which may readily serve to explain increased temperature, paralysis of the bowels, local congestions of intense degree leading rapidly to inflammation, the formation possibly of purulent infiltration, and death.

Our overwrought theories of microbic infection, it appears to me, make us partially blind to the broad notions of general pathological physiology, which I am confident will outlive narrow and confined notions of the origin and development of disease, and so it may be in the case referred to.

In no condition do we dread more the development of fatty degeneration of the heart than in that of chronic alcoholism. In all acute diseases, but particularly so in the pneumonia of adults, when we know we have to do with a chronic alcoholic, our prognosis of the outcome of the case should always be carefully guarded. No matter how mild the attack may apparently be in the beginning—no matter how hopeful we might be in other cases as to the future course of the disease—in view, perhaps, of the small area of lung involvement and the mildness of the general reaction present, danger is always lurking and may show itself almost at any moment, either during the acute stage of the pneumonia or in the early convalescent period, by sudden pulmonary congestion or oedema, with accompanying heart-failure; or, indeed, the heart itself may rapidly or suddenly cease to beat, and the patient die in a syncopal attack with dyspnoea and apparent asphyxia, or a convulsive seizure resembling closely a so-called uremic attack. The slightest effort may bring on such a result. Going to stool, raising himself, or turning over in bed without the help of a nurse may be among several efficient causes which bring about instant dissolution. Again, the fatal occurrence may come about without any accidental circumstance whatever to which we would direct attention.

Not only in acute diseases are these statements true, but they are almost equally true when the individual has apparently been in his usual health. Thus it is we hear of many cases of sudden death attributed to so-called heart-failure, which means nothing tangible or obvious, but which should mean fatty cardiac degeneration. If an autopsy is made it will frequently demonstrate the fact beyond reasonable doubt.

In certain autopsies carefully conducted, so far as visible appearances are concerned, a report is occasionally returned that no sufficient cause of death has been discovered. The heart is about of normal size, there is no valvular disease, and the cardiac fibre does not seem notably affected. There is assuredly no pallor of the heart muscle; the heart

may not flatten out on the table and the muscle may not be easily torn or lacerated; indeed, the heart muscle is deeply stained or of more than ordinary deep red coloration. In some instances this staining is due simply to the imbibition of the muscular fibres with the coloring-matter of the blood due to changes caused in this fluid. While this appearance is oftener present in acute febrile disease than it is where no such intercurrent complication has taken place, yet the cardiac appearances may be as I have described them in chronic alcoholics who have died suddenly.

The microscopical examination of the cardiac fibres in these instances, if made—and it always should be made—will not infrequently reveal manifest granular or fatty degeneration of muscular fibres, possibly limited, but more usually disseminated. Whenever the changes are limited we should be careful to examine the condition of the coronary circulation, and frequently there will be found endarteritis or atheromatous changes.

In the senile heart, especially among those persons who have led a moderately careful and regular life, we are more inclined to diagnose fibrous changes than fatty ones if the heart begins to show decided weakness, irregularity, and intermittences. With this condition there may be moderate enlargement—usually hypertrophous dilatation. There may be no abnormal cardiac murmurs, and frequently the pulse, instead of being irregular and weak, may be of good tension and very regular, showing trouble only by a little lack of fulness and undue slowness. Of course, the arterial coats both at the radials and temporals may be thickened, tortuous, and stand out prominently, owing to the shallow layer of subcutaneous cellular tissue.

The urine in these cases may be in fairly good quantity, but is ordinarily of somewhat low specific gravity, without sugar or albumin. An occasional granular or hyaline cast is often discovered. With a tendency to constipation, which often exists, the quantity of urine eliminated in twenty-four hours will sometimes be decidedly below normal.

With any little fatigue, with any slight error of diet, with any prolonged exposure, with any excessive heat or cold, with any rapid change of temperature even, these old people are apt to feel poorly. They lose appetite, they sleep less well, their bronchial secretion is increased so as to produce annoying cough for some days, they are apt to become lethargic and inclined to doze frequently, and it is not uncommon to have them complain of feeling dizzy or faint. All these symptoms are unquestionably due in some instances at least to certain fibroid changes in the heart muscle. These changes are, however, not usually limited there; they are more or less disseminated everywhere in the arterio-capillary system, and several of the different viscera are notably affected, and particularly is this true of the

kidneys, the liver, and the lungs. We have, in these cases the best expression, without doubt, of the general disease so ably described originally by Gull and Sutton and so well added to by the labors of George Johnson and other able writers.

As regards the effect of syphilis in producing cardiac degeneration, either of the fibroid or fatty type, I have very little to say from the point of view of my own personal observation and experience. In a few rare instances, it is true, where the syphilitic poisoning was intense and the constitutional effects had become wide-spread by reason also of its duration I have seen the internal organs evidently much affected.

Syphilitic gummata of the liver I have occasionally observed, and in connection therewith there have been fatty and fibroid changes. Undoubtedly the same products may occur in the heart walls, although very infrequently in the ordinary routine of general hospital or private practice. Its possibility, however, should be kept in view, and wherever we have to do with those changes in deep-seated organs of syphilitic origin which clearly show its special virulence we should pay particular attention to the condition of the heart. If there be signs and symptoms pointing clearly to cardiac weakness coming on slowly and increasing constantly it is good clinical conduct to have our mind alive to the possibility of an intracardiac gumma and to the fatty and fibroid changes which may depend upon or result therefrom.

After what I have written, the prognosis and treatment of these structural changes should be considered. In general it may be said that if the process has come on with some rapidity, or if the cause be possible of removal, the prognosis is far less grave, at least prospectively, than if the contrary conditions are true. Of course, in the fatty change of the heart, which I believe possibly or probably exists to a certain degree at least in a few anæmic young women, this condition is undoubtedly curable in a shorter or longer time by judicious methods of treatment. If the anæmic state should, on the contrary, become of a more advanced or pernicious type, we all know that while we may and do obtain temporary good effects, which for a while at least may seem to promise a permanent cure, our hopes are apt to be in vain.

This is thus far the history of the medicinal effects of large and increasing doses of arsenic and the use of intestinal antiseptics according to the method of Hunter in the treatment of pernicious anæmia. The able and exhaustive report of Cabot before the Association of American Physicians, May, 1900, would serve only to confirm the correctness and sadness of this view.

In all instances, of course, where the anæmic condition and the accompanying cardiac degeneration, probably fatty, depends upon or is occasioned by malignant, incurable disease, so recognized at the present time, we cannot properly hope for any amelioration of the

cardiac changes. In most instances where the alcoholic habit has been largely instrumental in bringing on signs and symptoms of cardiac fatty degeneration and similar changes in other viscera—if these changes are not too far advanced and if the alcoholic habit be entirely suppressed—we may reasonably hope in many examples for a measurable degree of improvement in the physical condition of the patient and possibly for a complete cure. This happy result can only be obtained with considerable time, however, and by absolute attention to abstemious habits of life, and, above all, by complete abstention from alcohol in future. Of course, if the alcoholic habit has been an excessive one and long continued, and if the patient has already reached middle life or passed beyond it, the ultimate outlook of the case is far less hopeful. In this matter, however, personal idiosyncrasy and constitutional tendencies should always be considered and much weight given to their due estimate.

I have known certain individuals to have a pronounced alcoholic habit of many years' duration, and yet during a large portion of the time they have shown no morbid symptoms or signs of special moment resulting therefrom. When morbid phenomena develop finally in these cases, pointing unerringly to involvement and degeneration of the heart muscle, I still feel a reasonable hope that they may be able to arrest their disease, provided always that I can persuade them to restrain absolutely their alcoholic appetite.

In other cases so soon as the cardiac degeneration is clearly present the onward march of the disease takes place apparently without halt or hindrance. The march onward and downward may be slow or rapid, but, unfortunately, it is sure, and our best remedial means are ineffective to delay or arrest its course.

In certain obese persons, by a proper system of diet and exercise and suitable cardiac tonics at times combined with the continuous and judicious inhalation of oxygen during weeks and months, we may sometimes obtain very good effects. The prolonged use of iodide of potassium in these cases, given in moderate doses, always supposing it is well borne by the stomach and eliminative organs (skin, lungs, and kidneys), is in the judgment of many capable observers very useful and takes the place oftentimes of nitroglycerin and the nitrites with great advantage.

A few observations of individuals, young or past middle life, have made me believe that the treatment of Nauheim in well-selected cases and managed with discretion and good judgment and with a mental eye, single and devoted to the best good of the patient, has been unquestionably of great use for a time. The great risk of this spa treatment, as of all others, resides in the fact that even intelligent, cultivated physicians, here as elsewhere, become in a sense the victims of

their own exaggerated enthusiasm, and when a patient comes under their care they are apt to push their treatment inconsiderately perhaps, and sometimes too far.

Again, it occurs—I have known such a case—an individual past the meridian of life had been sent to Nauheim for treatment by his family physician, and although the patient when he reached the springs was in no condition to go through the spa treatment—or originally, even, he was not a suitable case for treatment, either owing to his preconceived notions or the stress he laid upon carrying out what he was ordered from home to do—led the local practitioner of Nauheim to permit the following up of what perhaps, if his better judgment had acted coolly and deliberately, he would not have permitted, or in another case have only permitted in a very limited measure.

In some cases one treatment at Nauheim may be decidedly useful, but unfortunately has not been completely successful in establishing a cure. Such a patient is sometimes told to return another season, or another, and better results may or will be obtained. This, unhappily, is an error fruitful of bad consequences. The patient has really obtained all the good possible from the saline carbonic-acid baths and the regulated resistant movements. It would have been far better for these persons, in my judgment, if they had remained away from the spa later and if they had sought from other means all the improvement they could fairly hope for.

It is the wise, conscientious physician, who is thoroughly familiar with the personality, habits, and surroundings when at home of these patients, who should really guide and direct them. I say it most regretfully that oftentimes his voice is like as one "crying in the wilderness," and the wisdom of his forethought, wide knowledge, and clear-sightedness is rarely or perhaps never fully recognized. In senile changes of degenerative type affecting the heart, and especially where interstitial fibroid changes occur, accompanied usually, as I have already said, by more or less general changes throughout the whole arterial system, a wise conservatism should always prevail. It is utter foolishness to suppose that we can modify in any appreciable degree what has very slowly and surely taken place, and what is, after all, many times only the outward and visible expression of the progress at times or the result of "anno domini," from which man no more than other animals is exempt.

There is a natural growth and natural decay, and these fibroid changes in the heart and vascular circulation are to be wisely regarded as nature's showing in due season. In such cases, therefore, treat symptoms as they arise with the hope of temporary relief and temporary benefit many times, but no more hope to arrest or change the inevitable permanently than to change the river permanently in its

course by an insignificant and temporary dam. In the fatty degeneration which complicates chronic valvular cardiac conditions, which is either the cause or the result of cardiac hypertrophy or dilatation, something may still be done.

The general nutrition of these patients may be kept up by suitable food, and their emunctories may be properly stimulated when required by baths, diuretics, and gentle laxatives. Breathing pure air and gentle exercise in walking will sometimes prove remedial. The blood should be kept in good condition and tonics may be required. Heart stimulants are often temporarily useful. In the event of evidence that the condition is not progressing favorably, strychnine is advantageous when continued for some time, with occasional interruptions, in moderate doses. Where there is much arterial tension, with marked dyspnea, iodide of potassium, if well borne, will give temporary relief and occasionally proves permanently beneficial. All sudden or great efforts should be most carefully avoided, and especially is this true in the secondary great hypertrophy which follows aortic regurgitation, whenever the heart shows that its walls have become hopelessly degenerated. In these instances it is that many sudden deaths occur, as the records of our hospitals abundantly show, as well as occasionally experienced in private practice.

In cases of suspected syphilitic degeneration affecting the cardiac muscle, iodide of potassium, freely given, or the mixed treatment wisely ordered according to circumstances, should be our main reliance.

In writing the foregoing paper I might have insisted more than I have done upon the purely pathological aspects of my subject. I might, indeed, have given a careful description of pathological findings in these cases at the autopsy when it was made, and especially when made with particular reference to the condition of the cardiac walls and the coronary circulation. To have done so would have lengthened my paper unduly, and would, moreover, have taken away perhaps part of the interest attaching to it as a clinical study, upon which I would place special emphasis.

Having said this by way of an explanation I would now crave attention for a few words from the point of view of the gross and minute lesions present in the cardiac muscles in different instances. Wherever the heart is notably affected with fibroid changes the muscle there becomes tougher and more resistant, besides showing thinning of heart walls in places. In the spots thus affected there is a yellow-whitish coloration, which indicates somewhat the probable nature of the degeneration. This degeneration is prone to occur in patches and especially in certain regions of the left ventricle and near the septum and apex than elsewhere. Under the microscope the parts affected are shown often to be almost wholly composed of fibrous tissue.

In other cases, while the fibrous tissue is in great excess between the muscular fibres, the latter still are present but atrophied or degenerated more or less. The nucleus has sometimes disappeared as well as the striae, and there may be more or less pigmentary deposit in the form of granules, regularly or irregularly distributed. Wherever the nucleus of the muscle still exists the pigmentary granules are apt to be present in larger numbers about it than elsewhere.

The primary fibres are occasionally almost homogeneous in appearance. Alongside of fibres much atrophied or degenerated there may be others relatively healthy.

In chronic fatty degeneration of the heart muscle, especially if it is at all advanced as to its stage, the color of the muscle is notably pale and yellow in places. Sometimes, however, where the changes are not so far advanced, at least in spots, but more generally disseminated, the heart muscle, particularly of the ventricles where the degeneration is most pronounced, is less changed in color from the normal. However, in these instances the muscle has lost its consistence, is very flabby, and the heart flattens out and loses somewhat its healthy outline on the table; beside it has lost resistance and is easily torn and lacerated. Under the microscope the diseased fibres may show very numerous granules, or at an ulterior stage these granules may be replaced by many glistening, shiny, very refringent round bodies of large calibre, which evidently are oily or fatty. Here, again, the nucleus of the muscle may or may not have become degenerated or have disappeared entirely. The same is true of the lateral striae and the longitudinal fibrillations.

There may be sometimes an overgrowth of pigment granules. These granules may be deposited in the muscular fibre itself or in the interstitial connective tissue between the fibres. The pigmentary granules may be more or less irregularly placed. Usually there are a larger number near the muscle nucleus. Occasionally the whole fibre may be larger than normal and appear almost entirely homogeneous.

Alongside of some fibres completely degenerated there are others which are relatively healthy or diseased only in parts. The connective tissue between the fibres in typical fatty degeneration of the muscle is usually not much, if at all, increased in quantity. In other cases, especially where there are fibroid changes throughout the vascular system and in different viscera, there may be a considerable increase of interstitial connective tissue and also pronounced fatty degeneration.

For further and more complete and accurate knowledge of the pathology of these cases I would direct my readers to the best modern treatises on cardiac disorders, among which that of Gibson seems to me particularly valuable. To this author I feel especially indebted for much valuable knowledge, which I have not hesitated to utilize and to whom I now give full credit.

OSSEOUS CYSTS OF THE TIBIA.¹

BY CARL BECK, M.D.,
OF NEW YORK.

CYSTS of the long bones are of a decidedly benign character, and consequently they are accessible to conservative surgical treatment—*i. e.*, to local extirpation; but, unfortunately, their signs resemble those of osteosarcoma so much that the temptation to treat them alike is not small. Osteosarcoma being of a most malignant character demands the most radical steps—that is to say, prompt amputation. Osseous cysts demand simple opening and emptying of the cavity.

The grave prognosis of sarcoma arms the surgeon against any feeling of sentimentality. Under such fatal circumstances he will not shrink from urgently advising one of the most mutilating operations, because he knows that otherwise not only a limb but also life will surely be lost.

On the other hand, how painful must it be for a surgeon to find that because of his error of diagnosis such radical steps have been taken unnecessarily; that, in other words, an extremity was amputated where only an osseous cyst existed, which could have been cured by simple incision.

It is not very difficult to confound the two diseases. Osseous cysts resemble osteosarcoma in their slow and painless onset, often preceded by an injury, in the gradual bulging of the area involved, and in their preference of youthful age. These being characteristic features of osteosarcoma as well as of osseous cyst, it is evident, therefore, that the differential diagnosis cannot be made by considering the history, nor by inspection, nor by palpation.

The fact that the interior of the cyst is filled with opaque, bloody serum and that its walls are lined with a smooth coat, while in osteosarcoma solid masses are formed, indicates that an exploratory incision combined with microscopical examination would clear the question of diagnosis.

But here also, as in many other obscure ailments, the Röntgen rays have showed me their usefulness. Not only do they differentiate well, but they even give us more valuable information than the exploratory incision itself, which, therefore, should always be preceded by skiagraphic examination; and for the patient a photographic exposure is certainly more agreeable than an exploratory operation. After a conservative operation has been decided upon the microscopical examination may well be made after the operation.

¹ Case presented to the Surgical Section of the Academy of Medicine, March 11, 1904.

At a meeting of this section (January 9, 1899) I called attention to the usefulness of the Röntgen rays in a case of femoral aneurism which on account of its extremely thick walls showed no pulsation, so that it had originally been taken for osteosarcoma, an amputation then having been considered.¹

From a skiagraphic study of a series of osteosarcomas, to be published in detail in another article, I feel justified in saying that in osteosarcoma the outlines of the bone always appear more or less abnormal and indefinite, some areas even appearing entirely translucent; while in osseous cyst the cortex appears thin and narrow, but well marked and regular. The fluid centre of the bone is entirely translucent, the light shade showing the same regularity. The adjacent epiphyses are normal.

It is especially the regularity of the texture of the walls of the cavity as they appear on the skiagraph which seems to me to be the characteristic skiagraphic feature of osseous cyst in contradistinction to the irregular texture of osteosarcoma. I may add that the vicinity of the epiphysis is also in favor of osseous cyst for histological reasons, as will be explained below.

The following cases may serve as a practical illustration of the value of the Röntgen rays in this connection:

CASE I.—H. C., a well-nourished boy, aged ten years, emigrated from Russia several months ago and presented himself to me on November 18, 1900. His family history is good. He was always well until eleven months ago, when he fell into an excavation on the street. On account of the intense pain in the upper portion of his right tibia and the functional disability a fracture was thought of at first, but after having remained in bed for two days he was able to walk around again. Four weeks later he fell again on the street, showing the same symptoms as on the previous accident, but this time he had to stay in bed for four weeks. It was then that a swelling of the size of a large filbert was detected at the spine of the right tibia.

Three months ago he fell for the third time, then being confined to bed for six weeks. When he got up he was free from pain, but he limped and the swelling below his right knee had markedly increased. Walking had become more and more difficult.

The mother reported to me that she had sought surgical advice and that the tumor had been pronounced to be a malignant growth, which demanded immediate amputation in order to save the boy's life.

Inspection revealed a normal and freely movable knee-joint. Nearly the whole upper half of the tibia is occupied by a painless swelling which has the shape of a spindle, and is most pronounced anteriorly. It begins at the epiphyseal line, reaches its height at the upper third of the tibia, and merges gradually into the normal features of the tibia at its middle. The fibula appears to be entirely normal. The circumference of the leg at the most prominent point is 30 cm., while that of

¹ "On the Difficulty of Differentiating between Femoral Aneurism and Osteosarcoma," *International Clinics*, vol. IV., ninth series.

the left leg measures 25 cm. (Fig. 1.) The surface of the tumor is smooth. Its consistency is hard; a few areas appear slightly softer. forcible pressure reveals the presence of oedema. There is neither pulsation nor fluctuation. The skin is normal and movable. The inguinal region does not show the presence of swollen glands.

It was no more than natural, in view of these facts, to think that an osteosarcoma had to be dealt with; but before arriving at a definite conclusion I consulted the Röntgen rays, which revealed the presence of a large triangular shade, the base of which corresponded to the epiphyseal line. The triangle was surrounded by a narrow, dark, and regularly arranged shade, which represented the distended but other-

FIG. 1



Osseous cyst of the right tibia

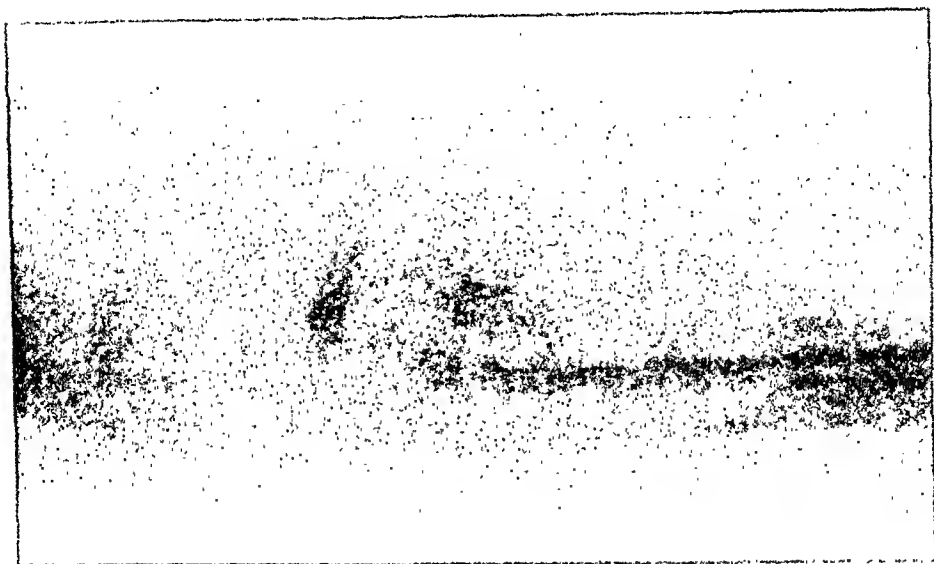
wise normal cortex of the tibia. The light shade was interpreted as a cavity, presumably containing a fluid of some kind. The normal outlines of the fibula can be distinctly recognized through the light area, although the inner surface of the leg rested on the photographic plate. (Fig. 2.)

The marked regularity of the texture of the cortex, as well as the uniformity of the light shade representing the cavity, convinced me that osteosarcoma was not present in this case, wherefore I advised a conservative operation. This was performed at St. Mark's Hospital, November 21, 1909.

The anterior surface of the tumor was first exposed. After having

incised the thin bone shell with a bone-knife bloody serum escaped through the opening made. Now an elliptic portion was removed from the osseous shell in order to get access to the large cavity, which was filled with black, bloody, viscid serum. There were no coagula. The

FIG. 2.

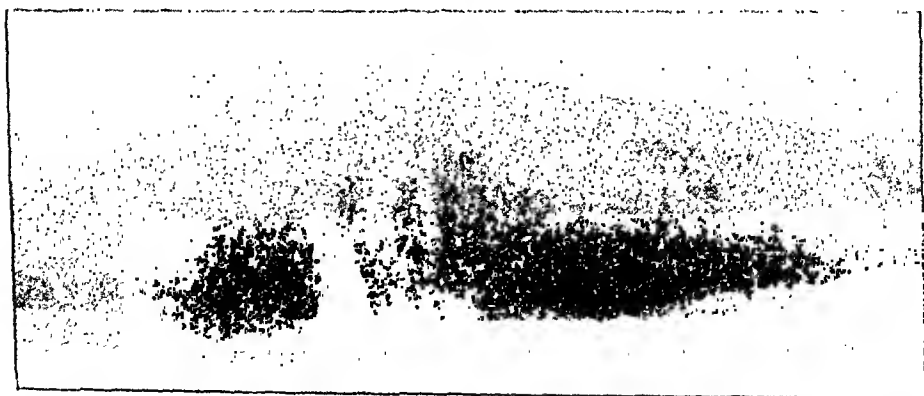


Osseous cyst of the tibia near its upper epiphysis.

osseous walls were lined with a thin membrane and the cavity was traversed by a few fibres of osseous remnants, arranged like network, but not much thicker than a thread.

After having scooped out the cavity thoroughly its osseous walls were so thin that by pressing them together forcibly--in fracturing them,

FIG. 3.



Osseous cyst of right tibia, two months after operation. The light shade at the centre of the tibia, beginning below the epiphyseal line, indicates the presence of a sinus.

in fact--their inner surfaces could be well approximated, so that no more cavity existed, so to say. Instead of packing the cavity I preferred to resort to this unusual procedure, analogous to the principles

of approximation of the chest wall in old pyothorax. Only in the lower edge of the bone wound a small iodoform wick was introduced.

There was considerable bloody oozing until five days after the operation, then the secretion became serous. Recovery was uninterrupted. Only a small sinus, discharging a few drops of serum in a day, is still present. The patient has now been up for two weeks and walks well. The repair is also well illustrated by the skiagraph (Fig. 3), which was taken two months after operation.

The microscopical examination of the excised bone-fragment and its membrane, made by the courtesy of Dr. Henry T. Brooks, showed the presence of many round cells, especially around the bloodvessels. There was no epithelial stratum nor any evidence of bacteria.

CASE II.—E. T., a girl aged thirteen years, born in New York City, presented herself to me on April 4, 1899. Eight months ago she

FIG. 1.



Osseous cyst of the tibia near its lower epiphyse

slipped on a stairway and was unable to stand on her feet again. The left ankle became swollen and painful. Fomentations were applied for several weeks. No medical advice was sought until the swelling, which after four weeks' rest had become painless, increased.

The family history of the patient is good. Inspection reveals a movable ankle-joint. The lower third of the tibia is occupied by a painless tumor, which appears like exuberant callus-formation. The external malleolus is normal. The circumference of the leg at the most prominent point is 22 cm., while that of the right leg measures 18 cm. The surface of the tumor is smooth; the consistency is hard. A skiagraph taken at once revealed the same condition present in Case I, with the difference that the shade of the cortex is somewhat larger. (Fig. 4.)

The operation was the same as in Case I. The cavity contained the same black, viscid serum; the walls of the cavity, however, were thicker than those of Case I, and to their inner surface a stratum of

grayish-white tissue was attached. It had the appearance of enchondromatous masses and proved to consist of cartilaginous tissue. The microscopical examination revealed an abundance of nuclei, especially of round cells, surrounded by myxomatous and disintegrated tissue. The walls could not be approximated as well as in Case I. by forcible compression. The remainder of the cavity, therefore, was packed with iodoform gauze. Recovery was perfect after four and a half months. The patient has remained well ever since.

The etiology of osseous cysts is still *sub judice*. Virchow¹ maintains that all osseous cysts are the softened products of degeneration of such growths that were solid formerly. Such solid tumors may have originated from erratic cartilaginous fragments left from the epiphyseal line.

Schlange,² according to his excellent monograph, observed cartilaginous fragments in the tissues of the cyst-wall. Similar observations were made by Franz Koenig³ and by Dietz.⁴

At the early stage osseous cysts, be they in the tibia or in the femur, are easily overlooked, the symptoms being insignificant. Sometimes there is very slight intermittent pain. The joints are freely movable and neither inspection nor palpation reveals any abnormality. After months the circumference of the extremity may appear very slightly enlarged, but the symptoms may not be fully appreciated until a fall on the thin shell of the cortex produces a fracture. Whether in our case a fracture had occurred could not be learned. Relying upon the Röntgen rays, I am inclined to believe that the previous injuries had the character of severe contusions. In view of the difficulty of differentiating between a benign cyst, accessible to conservative surgery, and osteosarcoma, demanding the most radical measures, I would advocate exposing all osseous growths to the Röntgen rays before passing a final judgment in a matter of such grave importance.

A CLINICAL AND HISTOLOGICAL STUDY OF A CASE OF CIRCUMCORNEAL HYPERTROPHY OF THE CONJUNCTIVA.

BY CHARLES A. OLIVER, A.M., M.D.,

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THROUGH the kindness of Dr. J. P. Worrell, of Terre Haute, Ind., I received a small piece of tissue together with the following clinical report:

On May 5, 1894, J. A. A., a farmer, aged sixty-one years, of excellent family history and without any evidences of constitutional disease,

¹ Ueber die Bildung von Knocheneysten, Monatsbericht der Berliner Akademie der Wissenschaften. Mathematisch-physikalische Klasse, 1876.

² Beiträge zur anatomischen und klinischen Kenntniss der Cysten in den langen Röhrenknochen, Festschrift fuer Eschsch, 1893, page 431.

³ Langenbeck's Archives, Band lvi., Heft 3.

⁴ Beiträge zur klinischen Chirurgie, Band xxvi., Heft 1.

came to Dr. Worrell with the statement that some six months previously he had noticed "a red point" between the cornea and the inner canthus of the right eye. There never had been any pain or local excitation. The functions of the eye always seemed normal. More recently the growth had encroached upon the cornea, but did not seemingly give rise to any impairment of sight.

When first seen the eyelids were healthy. The conjunctiva, other than that which was involved in the new growth, was normal except that it was crossed by large vessels that passed from the cul-de-sac toward the mass.

The tumor was sharply defined and was somewhat elevated. Its color was pinkish-white. Upon it large bloodvessels branched and terminated at a point situated at about the centre of its area. The mass had the appearance of being composed of nodules that had become flattened and almost obliterated in places by pressure. This nodulated appearance gave the margin of the growth a crenated outline. The thickness of the part of the mass which rested upon the cornea did not seem to exceed that of writing paper, it becoming increasingly thinner as it passed to the apparently undisturbed portion of the corneal membrane. The nodular portions of the growth were bluish-white in tint, while the intervening tissues appeared translucent.

No examination of the growth with the microscope was made.

Removal was accomplished by section of the conjunctival membrane just beyond the limits of the mass, with dissection of the growth from its submucous and corneal beds. While removing it, it was found that that portion of it which covered the cornea could be stripped from that membrane with but little resistance, leaving the exposed surface clean and smooth. This being done, the loosened conjunctiva was slid over the open area toward the corneal limbus and sutured into position. Union by first intention took place. Recovery was uneventful.

The patient was not seen until May 19, 1896, when he reappeared with a recurrence of the disturbance at the inner and the outer limits of the cornea. In the former position the growth was found to be the smaller, while in the latter it overlapped the corneal membrane some two millimetres. It extended out into the conjunctiva a distance of some five millimetres. Its vertical dimensions equalled five millimetres. Owing to a deposit of loosely applied epithelial debris upon its surface it was quite elevated and acuminate.

After excision of the mass the exposed area was thoroughly cauterized and overlaid with a conjunctival flap which had been brought from above. The flap united without delay. The sacrifice of conjunctiva incident to this operative procedure made so much contraction upon the outer canthus that no further loss of conjunctival membrane seemed practical.

On July 15th of the same year it became necessary to cauterize a small bud at the upper margin of the cornea.

From time to time, at intervals perhaps of two or three months, it was compulsory to cauterize small areas at different points along the edge of the cornea. This method of treatment maintained the eye in a comfortable condition, and seemed to justify the conservative plan that had been adopted.

From September, 1897, to May, 1900, the patient disappeared from observation. On his return, May 23, 1900, it was found that a marked

change had taken place. The growth had recurred upon the nasal side at a point at which it had not been seen for five years' time. It was somewhat quadrilateral in shape. Its greatest vertical diameter was about eight millimetres in length, while its horizontal diameter equalled six millimetres in width. It presented the same general appearance as that of the first growth. Upon the temporal side the mass had extended upon the cornea without any increased involvement of the conjunctiva. Along the upper conjunctival limbus it encroached upon the cornea until it almost reached the mass that was situated on the nasal side.

At this time an examination of some of the excised tissue by a competent microscopist showed that there was nothing malignant in the nature of the growth. (Nevertheless, the removal of the eyeball had been recommended by a prominent ophthalmic surgeon.)

Operative interference was again resorted to. The portion of the growth situated upon the nasal side was excised, the incision being kept in the line of the healthy part of the conjunctiva. The exposed surface was thoroughly seared with an actual cantery. Conjunctival flaps were formed, brought from above and below, and stitched into place. The removal of the mass from the other portions of the cornea was accomplished by excision of that portion of the growth which overlapped the cornea, this being followed by a deep cauterization at the limbus. During this procedure it was found that when the portion of the growth which rested upon the cornea had been removed there did not appear to be any involvement of any part of the conjunctiva except that which was immediately adjacent to the cornea and which had been destroyed in the thorough cauterization that had been made along the line of the corneal limbus.

The conjunctival flap on the nasal side readily united, while the furrows that had been produced by the cauterization procedure healed without any undue irritation.

When seen a month later it was found that the cornea exhibited an opacity at its margin similar to that which is shown by a rather broad *arens senilis*.

The patient when recently studied (December, 1900) did not present any evidence of a recurrence of the condition. The eye was quiet and vision was normal.

A note from Dr. Worrell, under date of May 1, 1901, states that the patient recently died from what was said to have been an attack of acute nephritis, there never having been any recurrence of the growth.

Upon receipt of the specimen I sent it to Dr. Edward A. Shumway, of this city, requesting him to prepare it for study with the microscope. In due time he returned a number of sections, with the statement that he had embedded the piece of tissue, which measured 5 x 4 x 1 millimetres, in celloidin before cutting.

Careful personal examination of the slides in association with Dr. Shumway's report showed that the involved portion of the conjunctival epithelium was greatly thickened. The deeper cells were cylindrical in form, and corresponded with the normal epithelium of the conjunctiva. Succeeding several layers of these cells there were layers of large, irregular polymorphous cells, the nuclei of which were very large, stained slightly with hæmatoxylin, and showed more darkly staining nucleoli. In addition to the appearance produced by the light staining

the majority of the nuclei evidenced signs of degeneration. They presented vacuoles of various sizes, some of which were so large as to press the nucleoli far to one side. The surface of the epithelium was represented by numerous layers of flattened cells, with shrivelled and fragmented nuclei, such as are seen in the horny strata of the epithelium of the skin. There was not any infiltration of the subconjunctival or corneal tissue with epithelial cells. Processes of connective tissue, however, extended upward into the epithelium, and carried bloodvessels. The cornea was represented at one end of the sections, and showed destruction of Bowman's membrane with decided round-cell infiltration. The subconjunctival tissue was quite vascular and was moderately infiltrated with round cells.

REMARKS. The clinical symptoms of the case were typically those that are found in circumeorneal hypertrophy of the conjunctiva, as seen in elderly subjects. There were not any gross secondary disturbances such as tessellated granulations in the conjunctiva, neither were there any of the mucoid or mucopurulent secretions that are so frequently noticed in cases of the acute localized types of the affection. The bulk of the mass was composed of the characteristic milky-white nodular depositions. Microscopically, the examination of the hyperplastic tissue about the limbus of the cornea showed a marked increase of the epithelial structures with pronounced sclerosis of the surface cells.

NITROUS OXIDE AND OXYGEN AS A SURGICAL ANÆSTHETIC.

WITH A DESCRIPTION OF A NEW APPARATUS FOR ADMINISTERING THESE GASES AND REPORT OF 100 OPERATIONS, THE NARCOSIS LASTING A HALF HOUR AND UPWARD.¹

By S. ORMOND GOLDAN, M.D.,
OF NEW YORK.

IN the use of nitrous oxide in combination with pure oxygen we possess an anæsthetic which must have for every operator a double interest—first, its universal safety; second, the fact that there is absolutely no physical condition of the patient which contraindicates its use. All will admit that in the interest of the patient the safest anæsthetic should always be selected. This is rarely done at the present time, for the reason that ether and chloroform are in the vast majority of instances considered the only anæsthetics adapted for surgical purposes. In the rare instances where nitrous oxide and oxygen are selected as the anæsthetic it is as a matter of necessity, not choice; that is, because other anæsthetics, for various reasons, are contraindicated. It might be as well to state right here that where profound and long narcosis is neces-

sary another anæsthetic should be selected; yet as our knowledge increases in the use of this drug its field for usefulness will greatly extend.

The use of a new anæsthetic or method is usually desired by those who have rarely or never used either. Nitrous oxide is so universally associated with dental work that the surgeon is prone to imagine it is not applicable to operations of longer duration; even if he thinks otherwise the old cry of complicated apparatus and great skill, both necessary and hardly obtainable in most hospitals, preclude its use. It is well known that in ordinary gas administration the production of anæsthesia is accompanied with intense cyanosis bordering on asphyxia; efforts have been made to eliminate these asphyxial symptoms by admitting air in various quantities, but in doing so anæsthesia also passed off, the patient becoming conscious.

The inhalation of nitrous oxide alone has very frequently been said to produce its effects simply by asphyxiation, but while true to a certain extent there is no doubt it has pure anæsthetic properties, and nothing demonstrates this more perfectly than its use in combination with pure oxygen gas. Here asphyxial phenomena are entirely avoided, yet if the gases are accurately proportioned perfect surgical anæsthesia can be obtained in most cases.

It is perfectly possible to administer gas alone for long operations. I have so used it; but a little thought will convince anyone that this is not an advisable thing to do, especially where we have gas and oxygen, for to anæsthetize a patient more or less cyanosis is necessary; then a breath or two of fresh air is given and the mask reapplied—that is, before consciousness is regained. This continual deprivation of oxygen, it is well known, abolishes metabolism. It may be questioned whether to keep this up for a long time would not be a more serious method than the use of ether or chloroform. Now the oxygen in the air exists to only about 20 per cent.; 80 per cent. is practically an inert gas (nitrogen), and to use this combined with nitrous oxide means, in the first place, we can never increase the gas sufficiently to obtain anæsthesia and at the same time utilize the oxygen to prevent cyanosis. The oxygen can never be regulated; this method must of necessity be one of deep anæsthesia by gas bordering on asphyxiation. In the administration of an inert gas and a small percentage of oxygen—that is, with the patient alternately anæsthetized and conscious, or nearly so—unless the administrator is particularly skilful it cannot be conducted without great discomfort to the surgeon. In short cases the method has no disadvantages; the surprise is that the dentist alone, and not the surgeon, makes use of it.

It must occur to everyone who administers gas that if a method could be devised by which the oxygen percentage could be regulated by using it pure in combination with nitrous oxide we would have an ideal anæs-

thetic. Without going into the history of the subject, it is simply necessary to remember that if the inert oxygen can be eliminated the nitrous oxide percentage can be increased just that much; then by using pure oxygen to the amount of 10 per cent. we can obtain perfect anaesthesia with no asphyxia. Does anything prove more conclusively that nitrous oxide has pure anæsthetic properties? Practically it is found that non-cyanotic anaesthesia is obtained by this combination when the oxygen varies between 8 and 15 per cent.

The late Dr. W. W. Van Arsdale, of New York, to whom I am indebted for many practical hints regarding this anæsthetic, used volumetric quantities of these gases in a large number of cases; this was about ten years ago, when this method of anaesthesia was first attracting considerable attention abroad and here. He said that these gases could not be used except in minor cases, the reason being that he could not vary his percentages of oxygen; but he lost sight of two very important practical points—that the same percentage will not answer in all cases, and, furthermore, it must be varied from time to time in the same case. To administer nitrous oxide and oxygen requires a more complicated apparatus than for ether and chloroform, and an absolute essential is the undivided attention of the administrator.

While it is possible to accurately determine the exact proportion of oxygen used in this method of anaesthesia, it is not practicable, as several cylinders would be necessary, each having a different proportion of the gases; then the cylinders would have to be freshly filled, as decomposition is said to take place (Hillischer) when these gases are kept together any length of time, rendering the mixture irrespirable, due to the higher oxides of nitrogen. This method, it can readily be seen, is impracticable. To obviate these difficulties several apparatuses have been devised to administer the gases from separate cylinders, the mixing in varying proportions taking place at the time of inhalation. All these apparatuses give the percentage of oxygen only approximately. We determine the percentage by the condition of the patient, varying, as said before, in ideal narcosis between 8 and 15 per cent., possibly at times more. One of the great features claimed for the apparatus shown is its simplicity; it represents a complete instrument for the following methods: gas alone, gas and ether, gas and oxygen, ether alone. The apparatus consisting of Fig. 1 was first devised for the administration of nitrous oxide gas alone. I then added the aseptic separable ether chamber for the gas-ether method (see *Journal of the American Medical Association*, December 15, 1900).

The gas stop-cock (Fig. 1) contains two valves. The inspiratory valve is set in an inner cylindrical tube, which works by a handle through a right-angled slit in an external cylinder supporting the expiratory valve superiorly, and inferiorly giving attachment to the gas-

bag for gas alone, or the inverted Y-shaped tube for gas and oxygen. The valves themselves are made of thin sheet hard rubber, and are

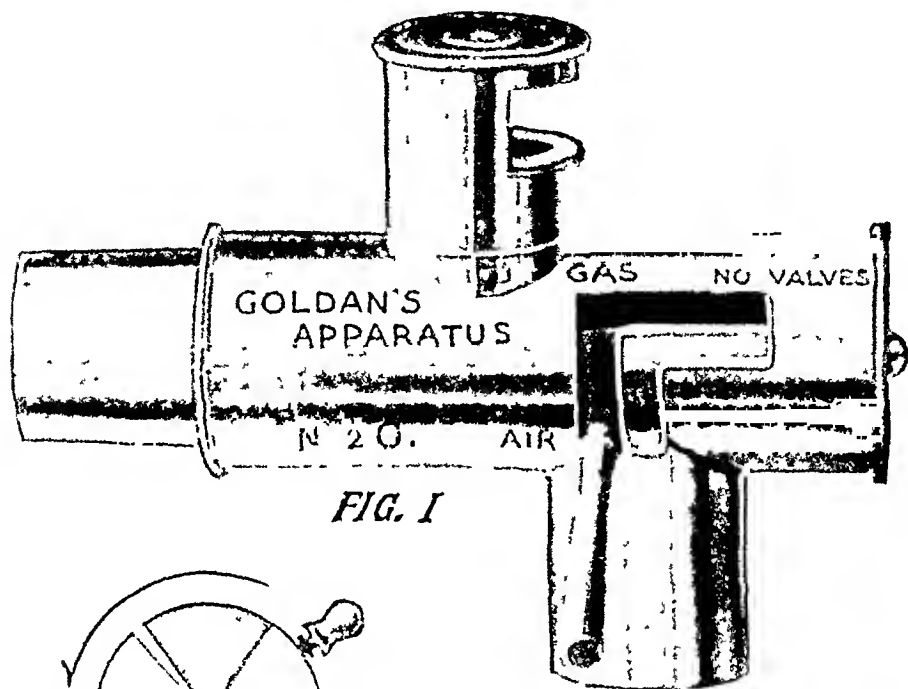


FIG. I

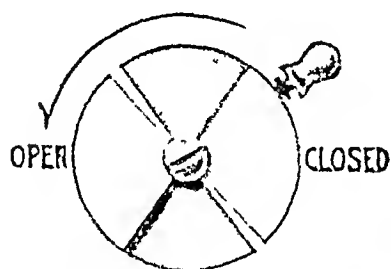


FIG. III

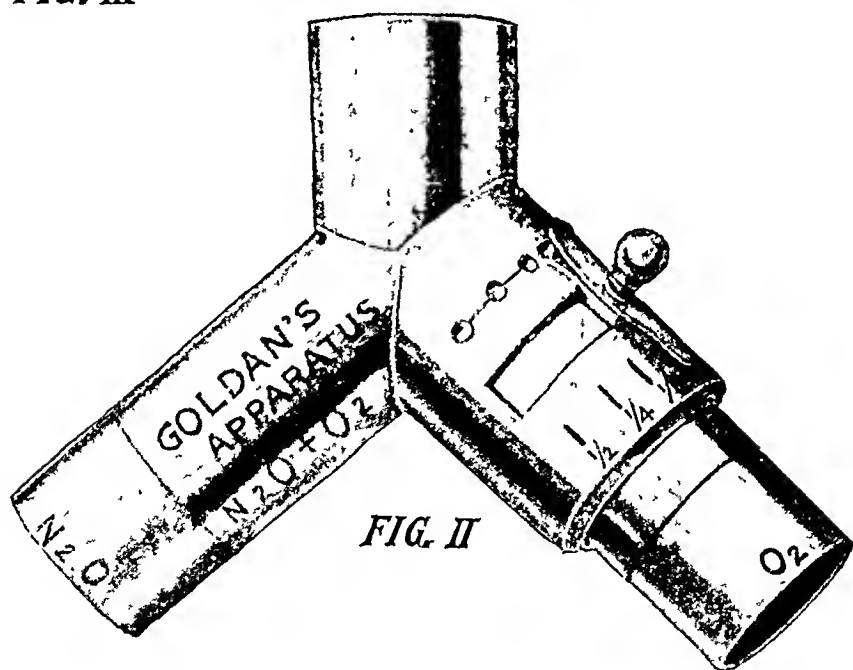
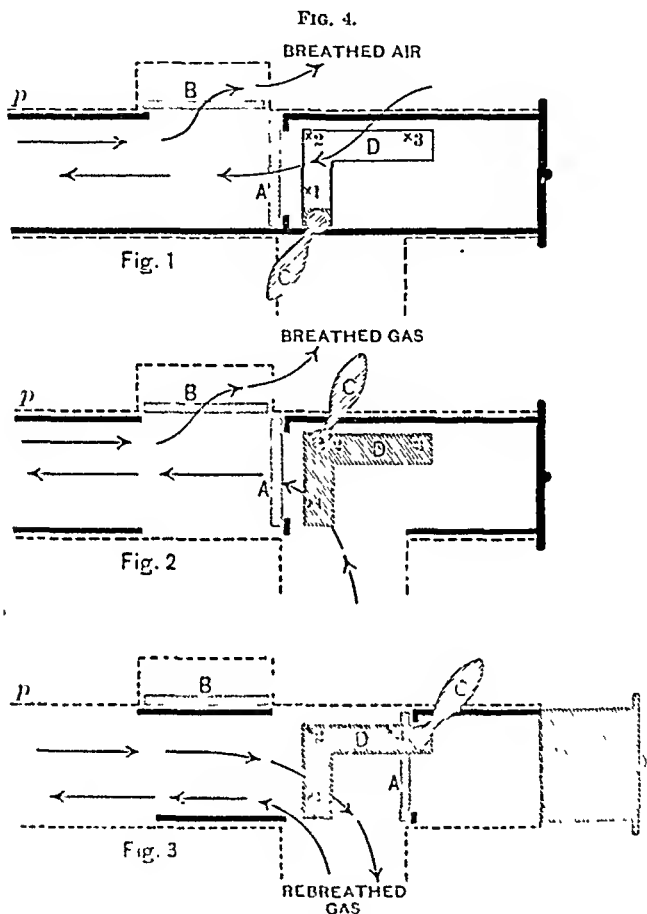


FIG. II

therefore indestructible. When the handle is turned down to the point indicated by "air" (see Fig. 1 diagrammatic plate, Fig. 4) the gas-bag is closed by means of the obturating function of the inner tube; when the handle is turned upward to the place indicated by "gas" air is ex-



Diagrammatic representation of stop-cock.

Dotted lines indicate external part of stop-cock, heavy lines and shaded part, internal tube. Arrows indicate direction of inspiration and expiration. The valves are indicated by shaded lines. A. Inspiratory valve. B. Expiratory valve. C. Index handle. D. Right-angled slit. P. Proximal end of stop-cock, attaching face-piece. X. Handle turned down; air breathed. X2. Handle turned up; gas breathed. X3. Handle turned up and back; gas breathed back into gas bag.

cluded and gas is inhaled by means of the inspiratory valve. Expiration of the patient pass out through the expiratory valve; at the same time the inspiratory valve is closed.

When the handle is pushed backward to the place indicated by "no valve" the valves are thrown out of action; the patient then breathes

back and forth into the gas-bag. This three-way action of the stop-cock is a feature not represented in any of the dental gas inhalers of American manufacture. This feature is used only with the gas and ether method.

The essential part of the gas and oxygen apparatus is an inverted Y-shaped tube (Fig. 2) attaching to the lower part of the valved stop-cock. It will be noticed that the right arm of the tubes is somewhat longer, to accommodate a revolving obturator which regulates the quantity of oxygen. This arm of the tube is so constructed that when the obturator is fully open it represents exactly one-half that of the nitrous oxide arm; if so used it would represent exactly 33 $\frac{1}{3}$ per cent. of oxygen. It may be said that anaesthesia is never possible with such a large percentage of this gas. Graduations are accurately marked on the surface of the tube as $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, representing respectively about 33, 25, 12, 6, and 3 per cent. of oxygen; these graduations have always reference to the opposite tube. The surface of the oxygen tube has also small depressions into which the metal spring slips when the oxygen is turned on; this permits the use of the apparatus without taking the attention of the administrator from the patient.

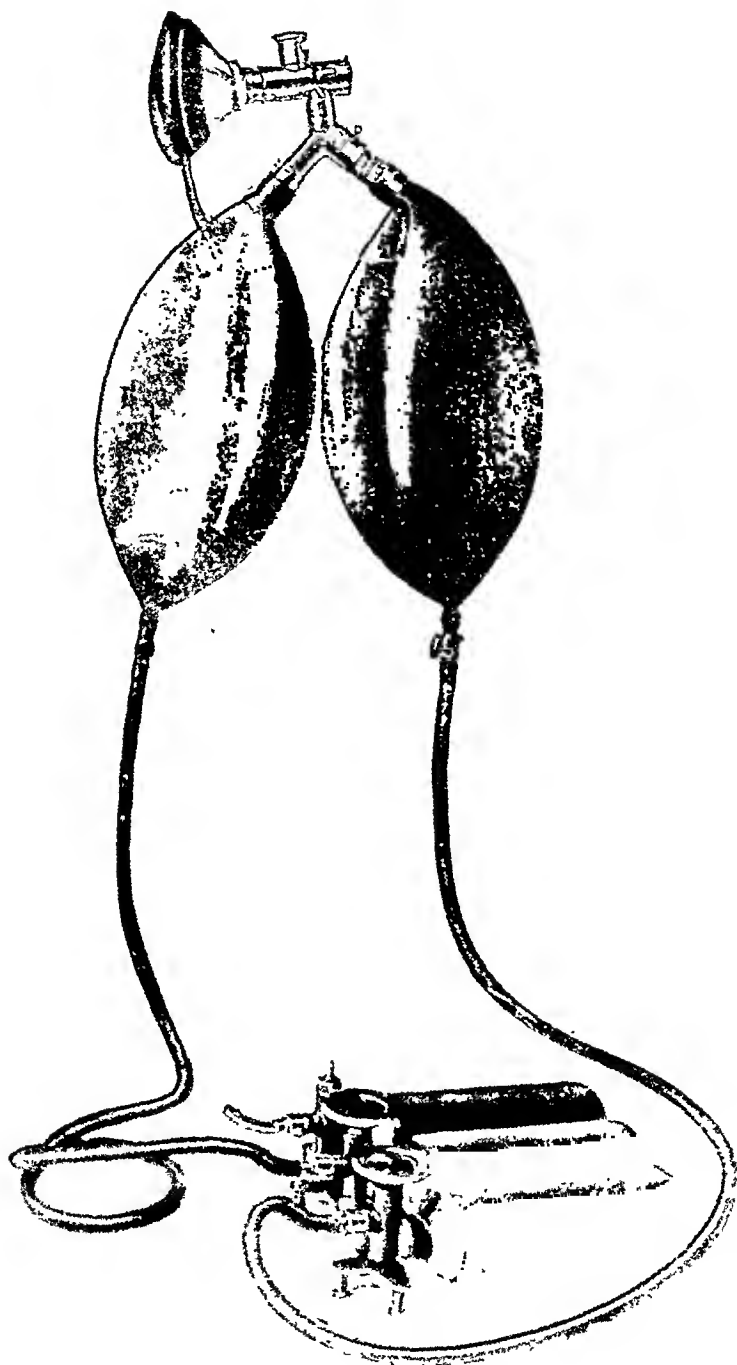
Fig. 3 shows the obturator, which opens by revolving from right to left. The small opening represents about 6 per cent. of oxygen. The vertical arm of the Y is the mixing-chamber for the two gases.

Two separate gas-bags are used, and by this means their respective distention may be more easily seen than with the single bag with septum. From four to six feet of rubber tubing connect the cylinders and gas-bags for transmission of the gases. The cylinders shown are the small portable ones of English manufacture, with foot attachment. Fig. 5 represents the gas and oxygen apparatus complete. There are two cylinders for nitrous oxide and one for oxygen, for the reason that a far greater quantity of nitrous oxide is used than of oxygen. The face-pieces of different sizes may be obtained of rubber, celluloid, or metal, with inflatable rims. For the cases having beards I have had made metal aseptic mouth-pieces of different sizes; these are used when for any reason atmospheric air cannot be entirely excluded when using the mouth-tube the nostrils must of course be closed.

In order to obtain perfect results with nitrous oxide and oxygen particular attention must be given to the following points:

1. The apparatus must be in perfect working order and always tested by the administrator himself.
2. A sufficient supply of both gases at hand.
3. Atmospheric air must be rigidly excluded. In patients with beards the nostrils may be closed; the mouth-tube may be used instead of the face-piece or the beard thoroughly moistened with water.
4. The patient should be prepared as for any surgical anaesthetic.

FIG. 5.



5. The gas-bags should never be fully inflated, but between one-half and two-thirds full. In this way the pressure of the gases is kept more nearly equal.

6. Oxygen should not be turned on immediately the administration begins, but sufficient nitrous oxide inhaled to replace the oxygen existing in the blood; three to six breaths will be sufficient.

Oxygen should be admitted gradually and in quantity determined entirely by the patient's condition, remembering cyanosis calls for more oxygen; evidences of excitement and returning consciousness meaning that less oxygen is required. In using the gases in long narcosis the taps of especially the nitrous oxide cylinders are apt to freeze, owing to the transition of the gas from the liquid to the gaseous state, the cylinders becoming covered with frost; to avoid this a towel wrung out of boiling water should be placed about the tap, but not about the cylinder itself.

The patient should always be placed upon the operating-table in the position in which the operation is to be performed; any position may be employed, providing it will not interfere with the anaesthesia. The preferable postures, in my experience, have been the dorsal and Sims.

Nitrous oxide and oxygen requires about double the time to produce its effect as does the gas alone, the gas alone requiring from 30 to 60 seconds; gas and oxygen from 60 to 120 seconds. In either case consciousness is so quickly lost that I have found it generally impossible to obtain statements from patients as to their subjective symptoms. Sensations are pleasant or unpleasant, depending much upon the temperament of the patient. Hallucinations in some form are not infrequently experienced, and as this may simply take on a pleasant or unpleasant dream it is occasionally difficult to convince the patients that they have not gone through an actual experience. I particularly remember a case where the patient, a man, upon recovering consciousness after gas for a short operation, for some time could not be convinced he had not been to a prize fight. It was an amusing experience to hear his more expressive than elegant remarks regarding the affair.

When inhaling these gases the sensations are much the same as with gas alone; anyone who has inhaled chloroform and nitrous oxide respectively must have noticed the similarity in the peculiar sweetish odor, or rather taste. The oppressive sensations of gas alone are usually absent, providing the gases are not inhaled from a long tube. I find these oppressive symptoms are more often due to the apparatus than to the gas, whether inhaled alone or in combination with oxygen; as the inhalation proceeds there develop paræsthetic sensations in the tips of the toes and fingers and also the tongue. There is a more or less sensory anaesthesia while consciousness is still present. As the jaws

become firmly closed it is well to insert a mouth-prop before beginning the administration, and also in oral cases when using the mouth-tube instead of the face-mask. Insensitive conjunctivæ and a snoring respiration are the best signs of anæsthesia in dental cases. This condition of snoring should be permitted for from three to five minutes before removing the mask. It will then be found that the available operative period will be very appreciably longer than it is when using the gas alone. The color at the height of a gas-oxygen narcosis is a pinkish hue, at times slightly bluish, but never the cyanosed condition seen when using the gas alone. The pulse and respiration are approximately normal—somewhat more rapid, if anything, and frequently far better than they were prior to the anæsthesia. The pupils are normal or slightly dilated, never markedly so, and the lids are closed and the conjunctivæ insensitive. Perspiration is profuse, particularly in the longer narcoses. Relaxation in abdominal cases is not as profound as with ether or chloroform, and this, it may be said, is the only serious drawback to the use of this anæsthetic in abdominal work. Consciousness, even in long narcosis, is immediately regained.

It is evident that any agent which is capable of producing insensibility must have more or less shock associated with it. While this is true regarding gas and oxygen, this shock is infinitely less than with ether or chloroform. Convalescence is never delayed with this anæsthetic. Nausea and vomiting occasionally occur, particularly in the longer narcoses, but are rarely persistent. Headache, more or less severe, is of not infrequent occurrence. Owing to the large quantities of the gases used, nitrous oxide and oxygen is the most expensive method of anæsthesia. Based upon my own experience, I should say in an operation lasting one hour there would be used from 100 to 150 gallons of nitrous oxide and from 10 to 30 gallons of oxygen.

In the report of the 100 narcoses where nitrous oxide and oxygen was used as the anæsthetic I have selected those lasting a half hour and upward; the shorter cases, covering almost the entire range of minor surgery, as tooth extractions, abscesses, enuretings, for a few minutes, etc., I have omitted. In the cases reported the operation in most instances was of shorter duration than the narcosis. When not indicated the narcosis continued from thirty to thirty-five minutes.

1 case double amputation of the breast and axilla	2 hours	to 10 min
1 " single amputation of the breast and axilla	2 "	0 "
1 " nephrectomy	2 "	25 "
1 " exploratory colotomy for supposed tumor of the stomach	1½ "	0 "
2 cases appendectomy (respectively)	1½ hours and 1 hour	0 "
2 " abdominal hysterectomy	1½ "	0 "
2 " removal of tubercular lymph nodes (see details of the third case where gas and oxygen were used)	1½ and 1½ hours	
1 case exploratory	1 hour	
1 " colotomy for diarrhoea	1 "	
2 cases pericystic abscess	each 1 "	

[illegible]

This last case was anesthetized by me for Dr. Howard Kelly, of Baltimore; the position was a most difficult one for any anesthesiologist—that is, the knee-chest for the placing of catheters, then the dorsal for the taking of an X-ray photograph. The patient exhibited some muscular movements of the lower extremities, rendering this photographic feature impossible.

The details of the narcosis I had the pleasure of conducting for Dr. W. W. Keen, in the Jefferson Medical College Hospital, are as follows:

The patient was a young lady of anæmic type; pulse, respiration, and temperature normal. Anaesthesia was induced with gas and oxygen in two minutes and maintained for thirty-three minutes. Consciousness was completely regained within one minute after the anæsthetic was discontinued. The color of the patient was a healthy pink, occasionally slightly blue. The blood was at times dark, but Dr. Keen said not more so than would occur with ether or chloroform. The pulse and respiration were about normal, pupils moderately dilated, eyelids closed. At the beginning of the operation the patient apparently once felt the knife. The operation consisted of the removal of adherent tubercular lymph nodes, during which the jugular vein was torn and ligated. Altogether the narcosis was a most satisfactory one. I saw the patient about one hour afterward. She had vomited once, the pulse was the same as before the operation, and the general condition good.

CROUPOUS PNEUMONIA.

A CLINICAL STUDY OF FIVE HUNDRED CASES FROM THE RECENT RECORDS
OF THE PENNSYLVANIA HOSPITAL.BY GEORGE WILLIAM NORRIS, A.B., M.D.,
OF PHILADELPHIA.

THE following five hundred cases of croupous pneumonia occurred in a period of about four hospital years, from May, 1897, to March, 1901, inclusive. Cases of doubtful nosology and the few that died within less than twelve hours from the time of their admission were omitted. The histories were for the most part complete and satisfactory, though in some, owing to oversight or inability to communicate with the patient, arising from his physical, mental, or linguistic disability, notes of previous illnesses and habits were scant and lacking.

The number of cases of pneumonia admitted to this hospital has greatly increased within the last two years, as the following figures show :

May, 1897 to May, 1898	total	82
" 1898 " " 1899	"	78
" 1899 " " 1900	"	169
" 1900 " March, 1901	"	171
		<hr/> 500

This increased prevalence is quite out of proportion to the city's growth, and as the area from which the hospital draws its cases has not been augmented during this period, the assumption that the disease has been more common seems reasonable. The city records show the following death-rates from this disease: 1898, 2482; 1899, 2124; 1900, 2959.

I. MORTALITY.

1. *General Mortality.* Out of 500 cases admitted, 125, or 25 per cent., died; 7 became phthisical.

2. *Sex.*

Males attacked	282	Mortality	50 per cent
Females " "	118	"	29 " "

3. *Nationality.*

Nationalities	attacked	Males	Females	Mortality	per cent
		attacked	attacked		
White	171	125	17	17	"
Negroes	29	15	14	31	"
Irish	128	21	15	15	"
English	41	13	13	13	"
Ireland	4	22	2	22	"
German	17	33	3	33	"
American	15	20	20	20	"
Foreign	14	21	21	21	"
Other countries	20	23	23	23	"
Total	<hr/> 499	Average		<hr/> 25	

The fact that the mortality among the Russian Jews, who are generally an ill-nourished lot and bear disease badly, is much lower than among the Irish and Germans, who are for the most part hardy, may be reasonably explained by the greater temperance of the former race in the use of alcohol, a drug which notoriously increases the death-rate of pneumonia.

4. *Intemperance.*

Out of 11 cases known to have been drunkards 7 died
Mortality 63 per cent

5. *Decades of Life.*

	Number attacked.	Number deaths.	Mortality
1 to 10 years	74	10	11 per cent
10 " 20 "	74	7	9 " "
20 " 30 "	155	24	18 " "
30 " 40 "	84	22	26 " "
40 " 50 "	67	20	31 " "
50 " 60 "	11	16	54 " "
60 " 70 "	13	10	77 " "
70 " 80 "	6	1	16 " "
80 "	1	1	100 " "

6. *Occupations.*

Male.	a. Indoor occupations	Mortality 26 per cent.
	Outdoor "	" 29 "
	b. Laborers 122	Died 12 " 31 "
	Teamsters 8	" 4 " 50 "
	Elevators 13	" 6 " 46 "
	School children 61	" 5 " 8.2 "
	Children under 3 years 11	" 1 " 9 "

Among other callings in life the cases were too diverse for classification.

The large number of fatalities among teamsters is probably due to their indulgence in alcohol.

The longshoremen, to whom this also in a measure applies, follow a calling which constantly necessitates the most strenuous physical effort, as is shown by the fact that even the most robust sooner or later develop emphysema or cardiac lesions which force them to find other occupations.

7. *Site of Lesion.*

	Number of cases.	Per cent. 500.	Mortality.
Right lower lobe	115	29 per ct.	18 per ct.
Left lower lobe	115	23 "	13 "
Both bases	60	12 "	48 "
Right apex	55	11 "	20 "
Whole right lung	45	9 "	26 "
Whole left lung	35	7 "	20 "
Left apex	20	4 "	25 "
Both apices	4	9 "	40 "
Right middle lobe	14	2 "	21 "
Undetermined	7		

The frequency of apical pneumonias according to decades :

1 to 10 years	.	.	.	.	.	.	.	.	.	.	.	20 cases.
10 " 20 "	.	.	.	.	.	.	.	.	.	.	.	9 "
20 " 30 "	.	.	.	.	.	.	.	.	.	.	.	15 "
30 " 40 "	.	.	.	.	.	.	.	.	.	.	.	8 "
40 " 50 "	.	.	.	.	.	.	.	.	.	.	.	1 "
50 " 60 "	.	.	.	.	.	.	.	.	.	.	.	5 "
60 " 70 "	.	.	.	.	.	.	.	.	.	.	.	2 "

8. Complications.

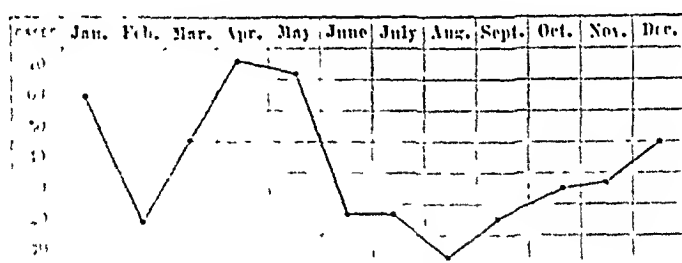
Total number complicated cases	115	Deaths	67	Mortality	40 per cent..
" " uncomplicated cases	355	"	58	"	10 "

9. Temperature.

		No cases.	Deaths.	Mortality.
Maximum temperature 99°	.	3	1	33 $\frac{1}{3}$ per ct.
" " 100	.	8	3	37 "
" " 101	.	30	12	40 "
" " 102	.	51	14	27 "
" " 103	.	153	33	21 "
" " 104	.	141	33	22 "
" " 105	.	75	16	21 "
" " 106	.	16	5	31 "
" " 107	.	1	0	0 "
" " 108	.	1	1	100 "

The foregoing table well illustrates the fact, clinically long well known, that highly febrile cases are much less to be feared than slightly febrile ones, the former indicating a sthenic attack, and being an index of the vital force and the reactive potential of the individual infected.

II. MENSAL FREQUENCY.



The preceding chart emphasizes the generally recognized prevalence of pneumonia in the winter, and more especially the spring months of the year. Its close correspondence to one published by Drs. Townsend and Coolidge,¹ of Boston, some years ago, serves to mutually corroborate accuracy and substantiate fact.

III. CHILL AT ONSET.

Out of 500 cases there are notes of a chill at the incipency of the attack in exactly 250. This phenomenon was doubtless present in a considerably larger proportion than the histories would indicate.

¹ Medical News, July 27, 1900.

One case is recorded in which a chill occurred on the twenty-fourth day of an attack of typhoid fever, in which a sthenic bilateral pneumonia developed and death resulted. In another case a chill preceded the re-elevation of temperature following a pseudo-crisis, occurring on the seventh day, the disease terminating by lysis five days later.

IV. TERMINATION BY CRISIS.

Three hundred and one cases ended thus; 74 cases by lysis. Days on which crisis occurred:

2d day	3	12th day	13
3d "	1	13th "	8
4th "	4	14th "	5
5th "	12	15th "	3
6th "	34	16th "	5
7th "	43	17th "	5
8th "	58	18th "	4
9th "	42	19th "	2
10th "	30	20th " or after	11
11th "	18		

The latest day upon which crisis occurred in an uncomplicated case was the twenty second. In all, four cases died after crisis had taken place, in a state of practical apyrexia.

The lowest temperature noted at the time of crisis was 95.2°. It occurred in a boy of fourteen years, on the sixth day, and was followed by recovery.

The conventional tradition regarding the more frequent occurrence of defervescence by crisis upon odd than upon even days is borne out by the preceding figures in the proportion of 174 to 156.

V. PSEUDO-CRISIS.

Pseudo-crisis was observed in 54 cases on the following days of the disease:

2d day	1	11th day	1
3d "	2	12th "	2
4th "	2	13th "	1
5th "	2	14th "	2
6th "	12	15th "	2
7th "	11	16th "	2
8th "	6	18th "	1
9th "	1	21st "	1
10th "	5		

Of these, two cases had two pseudo-crises; one upon the third and seventh days, the other upon the third and eighth days.

There were only five fatal cases in the above-mentioned 54. (Mortality, 9.2 per cent.)

Pseudo-crises were accredited when the temperature, after falling rapidly below 99°, reascended promptly above 102°.

VI. PREVIOUS ATTACKS.

One or more of these are known to have occurred in 57 cases, though the existence of the same probably were much more frequent than has been noted.

	Males	Females
Previous attacks within 1 year	11	1
" " 1 to 5 years	17	4
" " 5 " 10 "	10	4
" " 10 " 20 " 4	8	1
Recovered	33	9
Mortality	29 per cent	10 per cent
Two had 2 previous attacks, of which one recovered		
" " 3 " " " " " " " " " "		

VII. URINE.

Albumin and casts present	245	Albumin and casts present	88
Albumin alone	78	Albumin but no casts	8
Casts alone	4	Casts but no albumin	2
Not recorded	45	Not recorded	15
Neither albumin nor casts	128	Neither albumin nor casts	12
Total number of cases	500	Total fatal cases	125

VIII. COMPLICATIONS.

Disease	Number	Fatal
Jaundice	18	11
Pellrium tremens	17	12
Typhoid fever	15	7
Pleural effusion	12	1
Phthisis	8	6
Nephritis (acute)	6	3
Empyema	6	1
Malaria	5	1
Endocarditis	5	4
Pericarditis	4	3
Meningitis	1	1
Erysipelas	3	0
Gangrene of lung	3	3
Influenza	2	0
Otitis media	2	0
Rubola	2	0
Pneumothorax	2	1
Phlegmonia alba dolens	2	0
Parotitis	1	0
Phthoritis	1	1
Septic arthritis	1	1

Other diseases too scattering for tabulation: Uræmia, exophthalmic goitre, tonsillitis, insanity, volvulus, syphilis, gastritis, hepatitis, stomatitis, erythema multiforme, keratitis.

Sixty-one per cent. of the cases with icterus died.

Widely differing opinions are expressed by various authors as to the effect of jaundice upon the mortality. Mosler¹ considers it a most dan-

¹ In the case which died the effusion was bilateral
² 2 of the cases were malignant endocarditis
³ Reported by Dr. C. W. Ellis, *Public Medical Journal*, March 10, 1895
⁴ *Annals of the New York Academy of Medicine*, 11 x p 2

gerous complication, and found 73 per cent. fatal in 15 cases. Other authors regard this phenomenon as of but little importance. This is doubtless due to a loose employment of the term.

A slight icteroid tinge of the conjunctiva is very common and plays but a small rôle. Distinct cholemia is a very different matter. It produces great asthenia, increases the tendency to stupor and delirium, allays necessary cough, interferes with assimilation, favors tympanites, and perhaps increases the tendency of the lung lesion to spread by relaxation of the arterioles.

Schönlein has pointed out that these cases bear venesection badly, and has observed collapse following the application of wet cups; but bleeding followed by transfusion would certainly seem like rational therapeutics.

IX. THE PUPILS.

During the past year Sigheicelli¹ and others have called attention to the state of the pupils in pneumonia. It has been stated that anisocoria is met with more or less frequently in this disease, especially in cases in which the apices are involved. Eason² observed mydriasis on the side of the lesion quite commonly (24 times in a series of 54 cases), and attributes this phenomenon to irritation of the inferior cervical ganglion by the inflammatory process; pointing out that flushing and pallor, due to a similar cause, have long been recognized.

With a view of investigating, I have examined the pupils in 64 cases with the following results: In 33 of these cases the upper lobe of the lung was involved, yet inequality was only found in 2 cases—in one myosis, in the other mydriasis on the affected side. The pupils were large, apparently dilated in the majority of the cases.

From the foregoing tabulation pupillary inequality would seem rare. It must be further taken into account that anisocoria is by no means an infrequent condition in healthy persons whose eyes differ in refractive power. Especially is this the case where hypermetropia and myopia coincidently exist. Plastic iritis, too, might readily be overlooked. Mere observation of the pupils, therefore, without in each case a careful ocular examination, loses much of its value, although a unilateral mydriasis which disappeared as resolution progressed would point strongly toward the pneumonia as etiological.

X. ABNORMALITIES.

ONSET.

Onset, with acute delirium	1 case.
(A stoker jumped overboard into the Delaware River in mid-winter; was brought to hospital with temp. 94° and signs of pneumonia; recovery.)	
Onset with epistaxis	1 "
" " pain in the ear of affected side	2 cases.
" " severe abdominal pain simulating appendicitis	2 "

¹ Gazz. Med. Lomb., February, 1900.

² Scott. Med. and Surg. Journ., April, 1900.

RELAPSE.

Infection of second lung, following recovery of first, after twenty days . . .	1 case.
Infection of same lung two days after crisis of a seven-day attack, in a child . . .	1 "
Abscess of nasal septum; pus was not examined for pneumococci . . .	1 "

Osler¹ says he has never seen an instance of undoubted relapse, and it may be urged against the first of the above cases that a second infection—not a relapse—had taken place. But in the second case this seems to say the least unlikely, occurring, as it did, before resolution had thoroughly taken place and so closely following the primary infection.

XI. TREATMENT.

The treatment has been expectant and symptomatic. Venesection in sthenic cases to overcome cyanosis or marked dyspnoea has proved of great benefit. Wet or dry cups and the ice bag have been found useful for the relief of pleuritic pain. A mercurial laxative at the onset and the free use of opium to allay erythsm, pain, excessive cough, and to procure sleep, have been seldom omitted. Ammonium carbonate has been employed when bronchitis has been marked and the sputum very tenacious. Hyperpyrexia was occasionally combatted by sponging; more usually left untreated. When stimulation was indicated, strychnine, whiskey, spirits of ammonia, nitroglycerin, camphorated oil, caffeine, or digitalis were ordered. Oxygen inhalations were apparently the means of tiding a number of cases over the critical period. Transfusion in connection with bleeding was occasionally resorted to in cases where toxæmia was great.

While it has repeatedly been shown that a satisfactory number of acute pneumonias in healthy people of not too advanced age will recover without any treatment whatever, yet it is equally certain that much can be done to alleviate suffering, which, as much as healing itself, is the duty of the physician.

If we have thus far failed in our quest of a specific treatment, if we have not succeeded in diminishing the frequency of the disease, if we have been unable to reduce the fatalities below the number that confronted our forefathers, we have at least learned a few things which we ought not to do, and we still have before us the future, promise-laden, with the vast and as yet but little explored fields of prophylaxis and serum-therapy within its boundaries.

¹ Osler—Practice of Medicine.

HEART AND CIRCULATION IN THE FEEBLE-MINDED.¹

A CLINICAL AND STATISTICAL STUDY.

BY JOHN MADISON TAYLOR, A.M., M.D.,

AND

F. SAVARY PEARCE, M.D.,
OF PHILADELPHIA.

THE writers desire to present in this contribution the results of observations made at the Pennsylvania School for Feeble-minded Children at Elwyn, Pa. Studies were begun also at the schools at Vineland and at Haddonfield, New Jersey, but only the data from the first institution are embodied in this paper. They will be completed as opportunity shall permit, the research occupying so much time to complete that this is only a partial presentation of their work. It is not feasible to carry out parallel investigations as to the collateral factors—blood, peculiarities of innervation, secretions, etc.—necessary to a full understanding of these complicated states until the equipment of the schools shall afford larger opportunities for thoroughness.

Of literature on the subject there is little to be found.

The attention of one of us was directed some years ago to several cases of imbecility wherein the cardiac and circulatory disabilities were pronounced and seemed to bear causal relationship to the mental impairment. In some of these treatment of the defects was followed by marked improvement, and even now we have six cases under continued observation. It would be an obvious inference that if attention were given to the vascular defects in the earlier years of life this improvement would have been greater. A further plain generalization is that those cases of backward mentality, the product of developmental interference, could be mitigated by securing more nearly normal cerebral circulation and the maintenance of a blood-supply adequately freed from ptomaines and other intoxications. The lowered vitality of many of these individuals is shown in primary faults of development in many parts of the central nervous system followed by gastro-intestinal and other organic disorders, and as a sequel to these the blood and the other tissues suffer. This is most conspicuous in the lower types of so-called idiots. This subject has received very moderate attention. We have done a little in that direction. We are at this time especially attracted by those of the so-called imbecile class or backward-minded individuals in whom a fair degree of amelioration can be expected, and we hope yet to secure some practical results by treatment directed toward the

¹ Presented to the Section of Pediatrics, American Medical Association, June, 1900.
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vascular system and its innervation. For the idiot little can be expected from any treatment other than educational and hygienic.

The nervous system of the young child suffers from the effects of toxins in many ways not yet understood. It is possible that the foundation of much disease, especially that affecting the brain, is laid long before we are capable of suspecting or detecting its presence, and through the agency of insidious and unknown toxic agents. It is also a fair inference that much of this damage is expended in large measure upon the structures of the circulatory apparatus, through and by which the organs of elaboration and elimination are maintained in a condition of vigor and integrity. If we could control the activity of the vasomotor system alone much could be accomplished. Acute delirium, maniacal states, the rapidly developed melancholias—in short, the alternation of exalted or depressed states—may be taken as an expression of a cytotoxicity of the cerebral neurones. Again, it is reasonable to infer that the peculiarities of the mental phenomena depend in some measure upon the degree of cell-alteration as well as upon the character of the circulatory poison, also upon the number, condition, and situation of the neurones involved in the process.

Acute poisoning from the gastro-intestinal tract is known to precipitate infantile convulsions. If continued and repeated this may develop into epilepsy, and the irritated cortical neurones thus suffer more or less permanent damage. A mild form of toxæmia may produce vertigo and other pronounced but evanescent discomforts or disabilities.¹ Again, the autotoxæmias due to the suppression or disturbance of the functions of an organ, as seen in myxœdema, cachexia strumipriva, and those states due to the overproduction of the normal and the evolution of abnormal products of the organism, as in the condition wherein hydrogen sulphide is retained in the blood, exophthalmic goitre, acetouria, etc., all can be said to bear close relationship to circulatory incompetence. So, indeed, but to a less conspicuous degree, as in the other two subdivisions of Albu, auto-intoxicants occur from anomalies in the general metabolism without localization, as in gout and oxaluria, and those due to the retention of the physiological products of metabolism, such as uremia and the effects of imperfect oxidation, etc.

In a study made by Dr. Charles A. Oliver and Dr. A. W. Wilmarth, in 1891, it was shown that among the Mongolian forms of idiocy the general pathological condition bore close causal relation to imperfect development of the entire vascular system, with consequent disease of the structures all tending toward early fatalities. These individuals had club-shaped, cold, clammy extremities, necessitating extra clothing and exceptionally heated apartments. On them mere scratches became

¹ See also "by one of us, *Sajous' Annual*, vol. VI., "Convulsions."

ulcerous, and these ulcers failed to heal until warm weather returned. Ecchymoses were frequent and prevalent during any form of sickness, and they generally succumbed during the colder months of the year, with gross hemorrhagic or exudative lesions in the mucous tracts and other vital areas. The common etiological factor was great activity and a final overthrow of the nutritive centres during the earlier portion of the antenatal existence.

The subsequent part of this study consists of tabulated records of the 72 cases studied in the total number of 955 inmates examined: Males, 40; females, 32.

All cases were considered and only those recorded in whom there was any suspicion of lesion.

The cases were taken from among the higher-grade children chiefly, since it is in these we may hope to find transition epiphenomena of cardiovascular sort worthy of place in practical interpretation, and for whatever of help may come toward evolution through mechanical and chemical agents.

The percentage of boys admitted to the institution is about three to one compared with girls, probably on account of the fact that girls can be better shielded at home. Boys are 60 per cent. and girls are 40 per cent. of the total number. Boys are, as a rule, brighter mentally and stronger physically.

As detailed in our "Preliminary Report of the Heart and Circulation in the Feeble-minded," the writers have pretty conclusively in the present work arrived at a confirmation of the hypotheses recorded in that paper, and feel more than ever impressed with the great importance of the subject under consideration. From tabulation of the examination of the 72 cases carefully studied we find the following:

MALES Average age of the males (eight to twenty-two years) twelve years. Of these 14 were of low grade; 14 of middle grade, and 12 of high-grade imbeciles.

Heart. We found no notable transposition of this or other organs in the number. In 20 cases the heart was somewhat hypertrophied, in 1 greatly so; this is an athletic, medium-grade imbecile. In 2 the heart was undersized. In 4 cases the heart was lower by one rib than its natural position (without hypertrophy). The cardiac pulsation was feeble in 25 cases. An hypertrophied heart in the feeble-minded does not as a rule present the increased pulse tension found in those of normal intelligence.

Bradycardia (50 beats per minute or lower) existed in 3 cases; in these there was no other discoverable lesion, so that we conclude it to be perhaps an expression of central vagi irritation. The cardiac im-

¹ Journal of the American Medical Association, November 5, 1898.

pulse was very feeble in 12 cases, and the impulse in addition very diffuse in 10 cases; all this without gross evidence of lesion in the cardiovascular system. Thus there would seem to be a disproportionate correlation between the detectable organic lesions in the feeble-minded and the signs presenting; in other words, the central neuronie degeneration through deficient innervation may disturb circulation as does the organic disorder *per se* of the circulatory apparatus. At the same time the contention is made that organic diseases of the heart and bloodvessels do occur much more frequently among these defectives than in people of normal brain development. Thus careful observation and treatment of the defect will undoubtedly assist both physical and mental development of the imbecile. Irregularity of the pulse was noted in 5 instances among males where cardiac lesions coexisted.

Murmurs. There was no murmur among the males that obeyed the law of the so-called functional murmurs. Of organic murmurs there were six presystolic mitral and ten systolic mitral murmurs. There was one aortic systolic murmur and one double mitral murmur. Seventy-five per cent. of the heart sounds were the so-called valvular sounds, the muscular element being feeble or ataxic. The second aortic accentuation was not quite so frequent as mitral valvular sounds—as though the relation of the co-ordination of lungs and heart was proportionately more at fault than between the heart and systemic circulation. In one case the second sound could be detected only at the pulmonary cartilage, and in most cases this element of the second sound was also markedly accentuated.

Other special characteristics of heart-beat worthy of note were instances of marked arrhythmia in only three cases. Reduplication of the second sound was heard twice at the pulmonary area. In one case there was a patulous foramen ovale found subsequently at autopsy without physical signs to account for it during life.

Dr. Ales Hrdlika, in the *Twenty-fourth Annual Report of the Middletown, N. Y., State Hospital for the Insane*, gives the following figures as to heart disease in the insane:

Examined 1000 patients; found:

	Males.	Females.
Organic heart disease . .	10.6 per cent.	11.6 per cent.
Functional derangement . .	15.4 “	8.0 “

Of which there were noted:

Simple hypertrophy . .	5.0 per cent.	4.2 per cent.
“ dilatation . .	1.0 “	1.8 “
Mitral insufficiency . .	2.4 “	4.2 “
Aortic “ . .	2.0 “	0.6 “
Tricuspid “ . .	0.2 “	0.8 “
Heart very excitable . .	6.4 “	4.4 “
“ “ feeble . .	7.2 “	2.8 “
“ “ irregular . .	1.8 “	0.8 “

Thrills. A thrill was felt at the apex but twice, but, as noted in six instances, there were presystolic murmurs, as though the muscular force of the cardiac action was greatly weakened, which we contend is a constant phenomenon, just as the general musculature is enfeebled in these defectives. Exception to this is in those rarer instances of moral perversion whose relatively greater physical strength accompanying a smaller than normal brain capacity (thus without proper inhibition) obtains as a potent cause for aggravating the psychological imbalance already existing. Indeed, were bodily vigor less in these cases we might hope for diminished moral perversion.

Pulse and Circulation. Irregularity of the radial pulse was found in seven instances (17 per cent.), which is evidence that there is greater ataxia of the vascular system than in the heart itself. Studies of the effects of such drugs as digitalis as favorably affecting these cases in the feeble-minded are important, just as more careful observations of cardiac conditions in general practice yield better results in treatment. That peculiarities of the sympathetic innervation will become a fruitful field of research among the imbecile and the insane we feel certain.

The pulse-rate was over 100 in sixteen cases (40 per cent.). This cannot be certainly reported, since the exciting conditions of an examination may increase the rate of the heart beats. In thirty-five of these cases there was the clammy skin and cold, bluish extremities which warrants the conclusion that the neurovascular system was much out of proper equilibrium. In the central nervous system of imbeciles the cerebro-spinal and vasomotor nervous mechanisms lack development and balance. The pulse tension seemed increased in but two instances, excepting in two others where the left carotid pulse was comparatively stronger, and the right radial pulse was comparatively increased in tension as compared with the pulse of the opposite side.

In one case of an epileptic adult male imbecile Addison's disease was pretty positively present. It may have been only an expression of tuberculosis of the suprarenal bodies boding a more general tubercular infection, which is the cause of death so frequently at the antipodes of the race (of the imbecile and insane and of the physically weak of a high order of intellection). The *reflexes* were generally increased in the males.

FEMALES. The average age of the thirty-two females studied was twelve years. Of these eight were low grade, fifteen medium grade, and nine were high grade imbeciles. There was no instance of transposition of the heart or other organs among them. The heart was distinctly hypertrophied in six instances, was displaced down one rib in two instances, very evidently dilated in one instance, and was undersized, as shown by percussion, in three cases. In twenty-six cases the cardiac impulse was feeble, and in one instance the "impact" on in-

spection and palpation was very diffuse. In this instance there was a very perceptible thrill, although a murmur could not be heard. It is the opinion of one of us that the thrill which can be felt readily with the palpatng hand and yet not accompanied by audible sign (a murmur) is indicative of enfeebled myocardium rather than a vibration due to hæmatic or to valvular disease, so that in the imbecile of low type tissues generally we may expect more constantly to elicit this valuable diagnostic sign (the thrill) than in organic heart disease in individuals otherwise normal.

Murmurs. There were no functional murmurs heard among the females. This dearth of so-called functional murmurs in subjects otherwise giving audible signs of cardiac disease upholds the views of Jacobi that fewer and fewer murmurs can (if any at all) be designated as functional.

Of organic murmurs the presystolic mitral without thrill predominates. There were five such (16 per cent.) in the cases examined. There was one aortic systolic murmur accompanied by a thrill in a subject of fairly good physique and cardiac action. In two instances there was mitral regurgitation. In such cases compensation is better maintained than is true of other instances of valvular disease.

It is a singular fact that œdema is not often encountered among imbeciles with even marked evidences of cardiovascular disorder. Studies of the blood component by the physiological chemists may yet be fruitful in explanations of this, and may also throw some light upon feeding and on excretion of metabolites—a subject which appears to the writers important in the line of preventive and, indeed, in curative medication.

Irregularity of pulse-beat out of harmony with heart rhythm was again demonstrated as among the males, as stated under the proper heading. It occurred in 15 of the 32 cases (50 per cent.). Bradycardia existed in but three instances, and again where no demonstrable valve lesion was present. In over half (twenty) of the cases the radial pulses were rhythmic, but the alternating force of the pulse-beat was a notable sign of the prevailing status of vasomotor ataxia. Twenty-one cases were subject to rapid, feeble heart action—i. e., over 110 per minute. In twenty-five the surfaces of the extremities were cold, bluish, or clammy.

The females seemed of lower tone physically than were the males examined.

The figures of Dr. Hrdlika in the report previously referred to show "out of five female imbeciles no one presents a cardiac derangement; out of fourteen males with the same trouble we find 21.5 per cent. of organic and 7 per cent. of functional troubles."

This author had only nineteen cases at his command to study, and yet the proportion of imbeciles in the males studied presented organic

heart trouble in 21.5 per cent. and functional disturbances in 7 per cent.

CONCLUSIONS. In a detailed study of the circulation of seventy-two cases of feeble-minded children at the Elwyn School the writers have found a great number of varied cardiovascular signs, and these out of proportion to the mental defect—so much so as to warrant assuming organic vascular heart disease to be a large etiological factor in continuing the downward course of imbeciles. The plea is urged for careful anthropometric studies and for observations in detail of somatic disease other than that of the nervous system in cases of mental enfeeblement. They are also impressed in this study by the fact that many of the high-grade cases can be bettered much more by attention being paid to therapeutics of the cardiovascular disorders of imbeciles, also of the insane. The scientific laboratory studies of the blood and excretions will also in the future furnish valuable data, no doubt, in this direction, admitting the large rôle which biochemical products must play in the pathology of many diseases.

The action of certain alkaloids upon the peripheral circulation needs careful study and experiment.

The proper use of especially directed regulated movements (and imbeciles are notably good and willing imitators) will greatly help these afflicted beings. In uplifting the physique to however slight a degree the mentality will be improved.

We would urge also that overexercise of backward children is to be strenuously avoided as a part of their training. The impression should be made upon the teachers to withhold physical overwork, in view of their preponderating lowered physique and especially of their liability to cardiac disease, as demonstrated in this contribution. We do not wish to interfere at all with the good hygiene of fresh air and proper direction of active employments.

It can be safely affirmed that America leads in the practical application of these scientific truths which are gradually being formulated for the proper care of the dependent classes.

REVIEWS.

MANUAL OF THE DISEASES OF CHILDREN. By J. MADISON TAYLOR, A.M., M.D., Professor of Diseases of Children in the Philadelphia Polyclinic; Assistant Physician to the Children's Hospital and to the Orthopedic Hospital; Neurologist to the Howard Hospital, etc.; and WILLIAM H. WELLS, M.D., Adjunct Professor of Obstetrics and Diseases of Infancy in the Philadelphia Polyclinic; Instructor in Obstetrics in the Jefferson Medical College of Philadelphia, etc. Philadelphia: P. Blakiston's Son & Co.

ALL books from the stand-point of the reviewer may be divided into two classes: First, those of such excellence that to write of them is only a pleasure; and, second, those which compel a careful reading in order that something may be found worthy of praise. After a perusal of the present volume the reviewer felt very thankful to the fates which chose him the task, as the book is a most satisfactory volume in every way. It is published not as a treatise, but as a working manual, and in its 860 pages it covers the ground in a very thorough manner. It not only is the work of the two men whose names appear on the title-page, but others have contributed special articles along the lines of their particular work. Among these may be mentioned particularly the chapters on the Conditions Requiring Surgical Procedures, by William J. Taylor; the chapter by Charles N. Davis, on Skin Diseases, and that on Diseases of the Ear, by George C. Stout.

Of particular interest is the portion of the work devoted to the anatomy of childhood and the methods of examining young children. The diseases occurring at or near birth are classed together, and this arrangement is very satisfactory as a working method. It may be remarked, however, that the passage of meconium does not always signify ante-partum asphyxia.

In speaking of the treatment of asphyxia neonatorum it would have been better to have classified the various measures with reference to their relative importance, and by so doing to have placed the use of catheterization of the larynx toward the bottom of the list. It seems rather questionable whether it was worth while to include the method of Sylvester at all, as experience seems to show that it is of very little use in this condition on account of the weakness of the pectoral muscles. In any event, it seems unfortunate that the method by mouth-to-mouth inflation should be given the subordinate position in the list, as all who have used it to any extent will agree that if not the most efficacious it is certainly not far from it.

It is unfortunate that in the consideration of melaena space was not devoted to a more complete description, and particularly that no mention of any possible septic cause was included in the etiology. Investi-

gations made for some time past seem to point to an infectious cause in the majority of cases.

The chapter on the General Hygiene of Infants and Children is of marked value, but from three to four weeks after birth seems rather early to take the baby out for an airing, at all events without making the reservation that it be carried in the arms and not placed in a coach. One of the most interesting chapters in the whole book is that on Feeding. It is original in that it gives not only methods for estimation of the various ingredients, but—and here it is rather unique—instructions as to the care of the cow, kind of cow best suited for infant feeding, and an account of the various proprietary foods and their use.

The chapter on Nervous Diseases gives needed space to the consideration of idioey and imbecility occurring in children.

A paragraph which should be read by all those who meet with acute febrile diseases is that on the care of the hair in these conditions. The sacrifice of the hair is here decried as useless, and instructions are given whereby much mortification on the patient's part may be avoided.

In a word, the book reflects credit on the authors, and will make a valuable addition to the library of all who have to do with the care of children.

W. R. N.

A CLINICAL TREATISE ON FRACTURES. By WILLIAM BARTON HOPKINS, M.D., Surgeon to the Pennsylvania Hospital and to the Orthopædic Hospital and Infirmary for Nervous Diseases. Octavo. Philadelphia: J. B. Lippincott Co., 1900.

THE author of this treatise is a most ingenious surgeon who has devoted much time and thought to the surgery of the osseous system. He is connected with a hospital which probably cares for more fractures than any other institution in this country. With these facts in mind we open the book with a keen interest and are immediately struck with the magnificent scale on which it is contextured—thick leaved, remarkably clear in typography, and illumined by a series of the best skiagrams we have ever seen, illustrating almost every known fracture. A study of these pictures alone would give one a liberal education in broken bones.

The writer makes no effort to include and discuss all known or even all recognizable methods of dealing with these injuries; but, with a few exceptions, gives in great detail “that form of treatment which in his own experience has proved most simple and effective.” He aims to be practical, and hits the mark by utilizing his clinical lectures for a scaffolding on which to rear his work. He pays especial attention to those details, such as padding, bathing, bandaging, passive motion, the scoring of the edge of adhesive plaster, etc., which will be prized by the tyro and which not only add to the comfort of the patient, but materially influence the resulting contour and function of the injured part.

To estimate the force necessary to break bone, Hopkins experimented on an adult skeleton with a testing machine. The femur, tibia, and fibula sustained a transverse strain of 1155 pounds before breaking; the femur, a crushing strain of 3130 pounds; the tibia and fibula, 2270 pounds, and the humerus, 2530 pounds. The figures are accurate, but

lose much of their value because one skeleton only was subjected to the test, and because the gradual pressure of the machine is not akin to the forces usually producing fractures.

The popular theory that Colles' fracture is caused by a cross-breaking strain is doubted by Hopkins, who believes direct impact communicated through the carpus to be responsible in most cases. The injury is treated by a hybrid between the Bond and the Treves splints, the former being so padded as to well fill out the natural arch of the forearm bones. We add our testimony to the value of this procedure.

He maintains that in dislocation of the head of the humerus complicated with fracture of its neck the head of the bone should be ignored or removed, and that incision with reduction is inadvisable. He uses the internal right-angle splint for all fractures of the forearm, paying little attention to muscular action in causing displacement—a factor on which much stress is usually laid. He advocates the fracture box for fractures of the leg, employing a plaster-of-Paris cast as soon as the swelling subsides, the cast extending above the knee-joint except in fractures of the malleoli without deformity. He considers the ambulatory treatment of fractures unsuited for general use. He treats most fractures of the patella by applying to the thigh a wickerwork of adhesive plaster, to which an extension apparatus is attached and which relaxes all tissue tension on the upper fragment. He believes operation to be rarely indicated.

This treatise on fractures will be of great value to the general practitioner, who has not had the opportunity to master by actual experience the details of treatment, and to the surgeon who wants to know, and thereby profit, what others think and do.

F. T. S.

THE PREVENTION OF VALVULAR DISEASE OF THE HEART. A proposal to check rheumatic endocarditis in its early stage and thus prevent the development of permanent organic disease of the valves. By RICHARD CARON, M.D., F.R.C.P. London: C. J. Clay & Sons, 1900.

Ever since the knowledge of the true nature of valvular disease of the heart was established by the French pathologists, it has been recognized that chronic valvulitis is an incurable affection as far as the valvular defect itself is concerned, and as long ago as the beginning of the century Corvisart, in his work on *Diseases of the Heart*, expressed the hope that means might be found for preventing development of valvular disease. To some extent this hope has been fulfilled, for, as the causes of acute endocarditis and thus secondarily of chronic valvular disease have become known, greater care has been taken to prevent strains upon the heart during times of operation of such causes. There is little doubt but that the number of cases of chronic valvular disease following such conditions may be lessened or the severity of the valvular defect reduced. Naturally it is a difficult matter to prove that the institution of hygienic measures or certain forms of treatment has prevented the occurrence of a disease. It would be possible to ascertained a desirable action if these measures wholly prevented the occurrence of the malady or if a marked reduction in frequency could be found.

Careful clinicians have for many years been accustomed to auscult and otherwise examine the heart with particular care at frequent intervals in the course of rheumatic disease of any sort and no matter how trivial in appearance. In this way alone may the beginnings of valvular disease be recognized and suitably rigorous treatment instituted to lessen as far as may be the strain upon the heart and thus diminish the frequency of permanent defects or the seriousness of such.

What Dr. Caton proposes in the little book before us is practically a continuation of this plan with some slight additions. His treatment consists of three parts. (1) The rigid enforcement of rest in cases of rheumatic disease with beginning endocardial trouble; (2) a stimulation of the trophic centres through the repeated application of small blisters over the præcordia; and (3) the use of absorbent drugs, of which he prefers sodium iodide. The first and the last of these measures have been in constant use by clinicians, and the second has been employed by many clinicians in a less systematic way than by him and without any definite notions as to the *modus operandi*. Clinicians have always felt that the use of blisters over the skin exercises an important regulative effect upon the underlying organs and a curative influence in the case of disease. While they have been unable to justify by physiological or other demonstration the faith that was in them, observation has none the less thoroughly established the justness of their view, and if Dr. Caton's remarks regarding the reflex trophic effect of blisters solves the problem it will be but the substantiation of what has come to be a matter of common belief. The author reports in the book eighty-six cases observed in hospital practice during a number of years with his observations regarding the outcome. The clinical histories given are too brief to justify the reader of the book in forming any conclusion. The existence of a beginning endocardial trouble is based in practically all cases, as far as the notes before us are concerned, upon the presence of a murmur. This, as physicians are aware, is inadequate to the purpose. Many of the murmurs in rheumatism are transient and accidental in character, and would disappear of themselves when the disease had subsided. Some, no doubt, were the murmurs caused by beginning valvular disease, and these may have been caused to disappear through the action of the curative measures adopted by the author. Of these, we confess, rest seems to us the potent one. The blisters may be as useful as the author suspects, or they may have only incidental value in giving the physician an excuse for insisting upon prolonged rest. Valvular inflammation, for it is a true inflammation of the valves, does not differ essentially from inflammation elsewhere, and with suitable rest inflammations in all parts of the body tend of themselves to subside. It is difficult for the physician himself to realize the need of prolonged rest in a case in which the local signs of valvular disease are as trivial as they often appear and still more difficult to bring the patient to realize the importance of following directions to the same end. Dr. Caton's book, however, if it does not present a method which will invariably prevent the occurrence of valvular disease, will have served a useful purpose if it leads to a more general insistence upon the part of physicians on strict hygienic measures throughout a long period of time after the apparent subsidence of rheumatic disease, even though the indications of valvular disease are obscure or uncertain.

A TREATISE ON DISEASES OF THE NOSE AND THROAT. By ERNEST L. SHURLEY, M.D. Illustrated. Octavo, 744 pages. New York: D. Appleton & Co.

IN this volume Dr. Shurley has given the profession a text-book on the nose and throat that should be appreciated alike by the general practitioner and the specialist, though to the former it will prove of the most value, as, indeed, the author intends it should. In glancing over the book one notes that the arrangement is according to the general nature of the disease treated, not following the anatomical classification, as is most usually done.

He states that his aim has been to view the subject upon the side of practical experience and observation rather than to enlarge upon and argue upon different theories, and in this he has succeeded well. The book is as it claims to be eminently practical; the symptoms are classified, the diagnosis taken up and well worked out, and the details of treatment given in such a way as to leave no doubt as to the meaning. Although he naturally emphasizes the line of treatment he prefers in a given case, he explains his reason for so doing, and also gives other methods that have proved useful in other hands. His acquaintance with medical literature is thorough and comprehensive, as shown by the authors quoted and examples cited. Indeed, it may almost be said that there is a little too much of this, as in several instances where pages are quoted entire, and, although, of course, due credit is given, it detracts in a measure from the originality of the work. This is particularly noticeable in the chapters on Diphtheria and Tuberculosis, which are otherwise admirably treated.

Considerable attention is paid to the pathology of these two diseases, and long discussions entered into as to the microbe origin, and, although nothing new is brought out, the subject is laid before the reader with the pros and cons in a very plain and attractive form. In the treatment of the latter disease, more especially tuberculosis of the larynx, Dr. Shurley believes that the indications call for a vigorous campaign against the disease as a systemic one, and that local treatment is of very little value. In this connection he advocates the use of iodine, creosote, etc., given in conjunction with a protein, and says that in his experience the results with these agents have been much better when administered in this manner.

The chapter on Hypertrophie Rhinitis is exhaustive, much space being given to the etiology of the affection as well as the pathology, and excellent illustrations, many of them new, adding much to the text. He objects vigorously to Seiler's prophylactic treatment, thinking that in some cases it may rather increase than diminish the tendency to catarrh. He also deprecates the use of acids in the reduction of hypertrophies, relying more on the saw and the knife as well as the electro-cautery. In ozena he does not agree with the generally accepted opinion that the fetid odor is due to a biochemical action upon the retained secretion in the nasal chambers, but thinks it much more likely that the phenomenon is not alone the result of their retention in the nasal fossæ and the effect of ordinary putrefactive decomposition thereof, but pus instead arises from some peculiarity of either the secretion of the part or the histological elements exfoliated therefrom.

Of particular interest is the chapter on Intubation, the illustrations

of which are admirable. The book consists of some 750 pages, is written in an easy and readable style, and the text is amplified by over 200 illustrations, some of them taken from standard works, many of them original and all instructive. In the book are several pages of colored plates, showing normal and pathological conditions of the larynx and pharynx. There is also a chapter on local treatment, supplemented by an extensive formulary for sprays, inhalants, pigments, etc.

Dr. Shurley is well-known to the American profession as a laryngologist and rhinologist of high repute, and his contribution to the literature of the subject will undoubtedly have given the exalted position it deserves.

G. M. C.

PROGRESSIVE MEDICINE. A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS IN THE MEDICAL AND SURGICAL SCIENCES. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia, etc., assisted by H. R. M. LANDIS, M.D., Assistant Physician to the Out-Patient Medical Department of the Jefferson Medical College Hospital. Vol. I., March, 1901. Surgery of the Head, Neck, and Chest. Infectious Diseases, including Acute Rheumatism, Croupous Pneumonia, and Influenza. Diseases of Children. Pathology. Laryngology and Rhinology. Otology. Philadelphia and New York: Lea Brothers & Co., 1901.

THIS volume marks the beginning of the third year of this publication, and this year it bears at the head of its title page the following proud and merited criticism of its predecessors, "Awarded Grand Prize, Paris Exposition, 1900." The need for a discriminating and attractive narrative of the year's progress in medicine—a very different thing from an unwieldy, undigested record of all medical doings—has been admirably met by these quarterly, well-chosen, and well-told stories of medical advance. The contributors' commentaries are valuable to the reader, and help him sit with them in judgment and form serviceable conclusions whether confirmatory or dissenting. The same topics are considered as in the initial volumes of the two preceding years, and the echo of colonial policies is heard in extended and satisfactory reports of tropical diseases and of the characteristics of modern small-bore-rifle wounds.

More than the first quarter of the book is well devoted to the Surgery of the Head and Chest. Dr. Da Costa elaborates the pathology of the conditions dwelt upon, and draws clear conclusions from an array of authorities. Because it ignores glandular involvement, he condemns the use of arsenious acid in the removal of cancer except when of slight extent and when limited to the skin. The best results in rhinoplasty are still achieved in traumatic cases, and the artificial metallic bridge is reported of occasional but uncertain success. Extensive operation is counselled for the jaw in malignant disease, the results being more permanent than supposed. A new method of urano-staphylorrhaphy by Ferguson and an ingenious closure of salivary fistula by Lydston are described. The Trendelenburg position is advocated for operations upon the pharynx, larynx, and trachea. For the control of hemorrhage

and the prevention of infection in penetrating wounds of the chest, pleurotomy and drainage is advised according to Le Conte and Terrier. Many instances are cited of non-intervention followed by recovery from perforating high velocity, small calibre bullet wounds of the chest. Such wounds are not immediately infected. "The majority of the reports relating to the surgical treatment of phthisis have been unfavorable, but occasionally the attempt succeeds." The intrapleural injection of nitrogen, as advocated in selected cases of phthisis by Murphy and Loomis, is recommended as worthy of a permanent place in treatment. Of much interest is the report of Charles A. Morton of an abscess of the lung successfully treated by incision of the pleura, suture of the lung to the chest wall, and, finally, by incision and drainage. Tapping is condemned and incision and drainage advocated in empyema and in purulent pericarditis. Suture is advised for wounds of the heart. The superiority and likewise the impropriety of using the mallet and chisel in opening the skull is debated, and von Stein's instrument reported as opening the skull in four minutes. If the latter proves as swift and safe as reported it will be in the opinion of the reviewer invaluable. Cushing's method of Gasserian ganglion removal is recommended as furnishing maximum exposure with minimum compression of bone and injury to bloodvessels. The reports of craniotomy for idiocy and hydrocephalus almost invariably testify that the operation is useless. The foregoing are a few of the conclusions of this condensed, exhaustive, and instructive article.

Infectious Diseases, including Acute Rheumatism, Croupous Pneumonia, and Influenza, by Frederick A. Packard, is the next contribution. It occupies one-quarter of the book's space, and is a most interesting and instructive chronicle of much scientific study rewarded by notable progress during the past year. It is especially rich in confirmatory knowledge of the bacterial origin of disease—also in the modes of transmission—and, finally, in methods of treatment largely bactericidal.

Five observers have furnished strong evidence of the presence, in the articular fluids of cases of rheumatic polyarthritis, of a diplococcus which, when injected into animals, reproduces this disease, and also the diplococcus in the joints. The frequent sterility of the articular fluids in human polyarthritis rheumatica is noted in contrast to the foregoing. In influenza the presence of its bacillus has been observed in vegetations on the aortic valves. The observer concludes that the bacillus can be disseminated through the bloodvessels or lymph-channels. Among the surgical complications and sequelae of this disease are reported the inflammation of nerves, otitis, osteoperiostitis, and osteomyelitis. There is further testimony of croupous pneumonia of infectious character and of the serum treatment of this disease. The presence of diphtheria and of the Klebs-Loeffler bacillus is reported in a pony, which is noted as of interest in connection with the supposed immunity of the horse from this disease. The exposure of children to the contagion of measles to protect them from acquiring it in later life is condemned, it being preferable to completely escape it. There is confirmation of the etiological nature of the diplococcus scarlatinae of Glass. There is full report of an important observation by Clement Dukes of a "fourth disease," apt to be confused with rubella, and not unlike mild scarlet fever. The association of vaccination with syphilitic infection is characterized as absurd. For smallpox, salol, sixty grains daily, is reported to act

efficiently upon the micro-organisms secondarily infecting the vesicles. This drug is said to avert pustulation and prevent or minimize scarring. The transmission of malaria by the mosquito seems definitely proven by Manson's infection of himself by mosquitoes imported from Italy, the malarial parasite being observed in his blood. A counter experiment at his suggestion was made in the Roman Campagna, where four people, protected from mosquitoes, dwelt from early July to late September without contracting malaria. The practical treasure of a very valuable and comprehensive review of a vast typhoid fever literature is contained in the following: If the presence of the typhoid bacillus has been observed in the lung and urine, pointing to the necessity of sputum and urine disinfection as well as that of the feces, it has been experimentally shown that typhoid infected water slowly sterilizes with continuous freezing; some bacilli were still found in ice nine weeks old; the leucopenia of typhoid gives place to leucocytes when perforation is imminent; the classic symptoms attributed to perforation are now assigned to post-perforative peritonitis; the reports of Cushing, of Packard and Le Conte, and of Shattuck, Warren, and Cobb emphasize the necessity of the earliest recognition of perforation, the advisability of prompt exploratory laparotomy in the presence of abdominal symptoms, and the tolerance of typhoids locally anesthetized to this operation. Plague, and the investigation of its prophylaxis; dysentery, and the confirmation of Flexner of Shigo's bacillus, and the observation of Malta fever in Puerto Rico, the Philippines, and several portions of the British Empire are all noted in extensive chapters on these diseases.

The Diseases of Children, by Floyd M. Crandall; Pathology, by Ludvig Hektoen; Laryngology and Rhinology, by A. Logan Turner, and, finally, Otology, by Robert L. Randolph, are most completely reviewed. Lack of space prevents more extended comment.

On laying down this volume of *Progressive Medicine* one is impressed, as by its predecessors, with the vast array, the condensation, and the judicious selection of contemporary testimony presented—a tribute to the contributors, editors, and publishers naturally follows, and the concluding reflection is reached that without such a publication and reference to it most men must remain culpably ignorant of the medical thought and advance of the day.

J. M. S.

INFANT-FEEDING IN HEALTH AND DISEASE. A Modern Book on all Methods of Feeding. For Students, Practitioners, and Nurses. By LOUIS FISCHER, M.D., Attending Physician to the Children's Service of the New York German Poliklinik; Bacteriologist to St. Mark's Hospital; Professor of Diseases of Children in the New York School of Clinical Medicine; Attending Physician to the Children's Department of the West Side German Dispensary; Fellow of the New York Academy of Medicine, etc. Containing 52 Illustrations, with 16 Charts and Tables, mostly original. Pp. 368. Philadelphia: F. A. Davis Company.

THE study of the best methods for the feeding of infants and young children has opened such a wide field for research that contributions to the literature of the subject by men of experience are always wel-

come. The subject is one of particular interest to both the general practitioner and medical student, for as yet far too little is known, especially as to how a young child can be properly fed by artificial means. The little book before us is written with a view of bringing before the general practitioner the best modern methods of infant feeding in the plainest manner possible, and having been written by a gentleman of unusually wide experience in this department of pediatric medicine, ought to be a work of value to its readers.

The author has divided his book into two parts: the first commences with a description of the infantile digestive tract and its ferments; then follows the chemistry of milk, breast-feeding, and kindred subjects, and the modification of cow's milk. The section on Digestive Ferments and their Chemistry is very thorough and contains the most recent work on the subject, but in our opinion the style of the article would be improved if the sentences were longer and more complete. The continual use of authors' names in parentheses distracts the attention. These references might have been indicated by numbers referring to the list of quoted authors which is at the end of the book.

The section on the Chemistry of Milk is very good except for the same constant bracketing of authors' names. The section on Breast and Artificial Feeding shows very well the wide experience of the author and his careful study of the details of a specialty in which attention to details is of so much importance. We are glad to note how much simpler the methods of calculating milk elements are becoming, and those described are the least complicated we have yet seen. We think, however, that reference should have been made to the accurate and painstaking works of Westcott, Bauer, and others in this line.

The second part of the book deals chiefly with feeding by infant foods, and here we are sorry not to be able to share the author's enthusiasm in the results obtained from the use of Gaertner's mother's milk and some other foods of the same class.

A number of very practical points are given, among these a series of diet lists for a nursing mother, on pages 76 and 77; the tests for the adulteration of milk, and the section on the Feeds of Infants, the latter being a subject about which far too little is known.

Some errors in proof-reading, such as are common to all first editions, are noted; thus on page 73, in the thirtieth line, "is" should be "are." The paragraph beginning with the tenth line on page 82, referring to the maintenance of wet-nurses in foreign hospitals, might be improved in construction. The phrase "quite some," page 279, is undoubtedly an oversight in proof-reading.

We are pleased to see that the author's experience of milk laboratories exactly coincides with our own.

We take pleasure in recommending Dr. Fischer's book, and feel certain that it will not only be a valuable aid to the general practitioner and student of medicine, but will also do a good work in aiding the spread of the knowledge of the important but as yet little understood subject of scientific infant feeding.

W. H. W.

PROGRESS OF MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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The Basophilic Granulations of the Red Blood-corpuscles.—O. MORITZ
(*Deutsch med. Wochenschrift*, 1901, xxvii., p. 68).

While most authors have been under the impression that the basophilic granulations sometimes observed in the red blood-corpuscles are evidence of degeneration which may have some importance from a diagnostic standpoint, others have believed that they are unimportant artefacts or post-mortem phenomena. Grawitz has produced them in mice by heating; Strauss, in frogs and in the rabbit by pyrocin, and Hamel by the feeding of lead to white mice. Moritz, in a series of investigations, succeeded in producing the basophilic granulations in all of five rabbits fed upon pills of acetate of lead, and in one in which the acetate was given subcutaneously. They were found in greater number in two rabbits to whom pyrocin was given subcutaneously. He is further able to support Hamel's observations, that six workers in a lead-color factory, only one of whom had any suspicious signs of lead intoxication, while another had shown symptoms some time before, all showed typical basophilic granulations of the erythrocytes. He has found these granulations also in five other cases: twice in leucæmia, in malaria, sepsis, and carcinoma cachexia.

Excretion of the Bence-Jones Body in the Urine (Albumosuria) in Association with Myelomata of the Ribs.—KALISCHER (*Deutsch med. Wochenschrift*, 1901, xxvii., p. 54).

The patient was a woman, aged sixty-seven years, whose family history was negative; one daughter had died of pernicious anæmia. In July, 1899, the patient began to complain of neuralgic pains in the lower part of the thorax, and of difficulty in breathing. These pains, in the beginning spasmodic, later became permanent and lasted up to the death of the patient.

There were also eructations and nausea, in association with a sensation of præcordial anxiety, coming on without any relation to the taking of food. After December, 1899, the patient was unable to leave her bed on account of the pains which were brought on by walking, sneezing, coughing, or bending, and on account of general weakness. The physicians in charge made a diagnosis of hysteria and neurasthenia. The examinations of the urine were negative, showing only once, toward the end of this period, a trace of albumin. In July, 1900, the patient was first seen by Kalischer. She could not move forward on account of severe pains in the chest, which increased with every step and were continuous, with occasional sharp exacerbations. No abnormalities were to be discovered in the internal organs or central nervous system; the eye-grounds were normal. Sensibility of the skin was normal, except for a hyperalgesia on touching the lower anterior part of the chest. There was especial tenderness over the points of junction of the cartilages and the bones of the fifth, sixth, seventh, and eighth ribs on the left side. There were also some points on the sternum, clavicle, and scapula which were painful on pressure. At that time the only complaints were of a continuous bitter taste in the mouth, loss of appetite, general weakness, and sensation of anxiety. The urine showed an average daily amount of from 1800 to 2000 c.c.; reaction neutral or slightly alkaline; specific gravity 1015; trace of albumin; no casts. On further examination it was found that, on heating the urine to a certain degree, there was a profuse precipitate and clouding, which cleared up on further heating, disappearing entirely on boiling, but coming down again on cooling. There was a profuse precipitate with nitric acid appearing in the cold, dissolving by heat, and appearing again when the urine cooled. The cloudiness appeared at 55° to 60°, the clearing at about 85°. Later a striking softness and bowing, with angular depressions and prominences of the ribs, from the third to the eleventh, became evident; this was especially marked at the junction of the ribs and cartilages. Swollen tender points were noted on the sternum, clavicles, and scapula. Every movement of the arms, mere turning, a deep breath, or too active speaking caused severe attacks of pain. Rapid emaciation, increased anxiety, and fainting attacks followed. Examination of the blood showed a slight increase in the number of leucocytes; nothing remarkable in the red blood-corpuscles. The urine diminished from 600 to 800 c.c. a day. At times albumin was found, but the Bence-Jones body was continuously present up to the time of death, which occurred in the middle of November, about a year and a half after the onset of the disease, resulting from increasing weakness and paralysis of the heart. Only a partial autopsy was allowed. Despite careful handling of the body, palpation showed fractures, depressions, and angular protrusions of the ribs, as well as slight swellings and irregularities of the surface of the ribs, sternum, clavicle, and scapula. The ribs felt soft and were abnormally movable. The anterior part of the ribs from the second to the eighth on the left side were removed. They could be readily cut with ordinary scissors, while from the surface a brownish-red pap-like substance similar to splenic pulp welled up. The spongy and compact bone substance of the ribs had almost entirely disappeared, leaving only an external shell as thin as paper. All the ribs were easily broken, and showed various fractures, and, on the left, diffuse club-

shaped swellings, or, again, more localized, yellowish elevations from the size of a lentil to the size of a pea, and extensive roughnesses and unevennesses especially on the posterior and lower surfaces. Angular protrusions were also to be felt over the posterior parts of the ribs. Nothing abnormal was noted in the pleuræ, pericardium, heart, or lungs. With the ribs there was also removed a piece of bone from the under part of the right humerus. Here the marrow had its normal color, except for small reddish-brown spots, and neither the compact substance nor the spongiosa had disappeared. There was no widening of the medullary canal. Smear preparations from the marrow and the diffusely diseased ribs showed that, in the ribs, there was a well-marked increase of the colorless round cells without "tumor elements" or foreign structures. The condition might then be assumed to be a hyperplasia of the marrow of lymphoid character (myeloma). The marrow of the humerus was normal microscopically as well as macroscopically. The author points out the similarity of the case to the few others which have been reported in literature.

The Etiology of Yellow Fever.—The preliminary report of Reed and his associates on the etiology of yellow fever has already been reviewed in the February number of this JOURNAL. REED, CARROLL, and AGRAMONTE (*Journal of the American Medical Association*, February 16, 1901, p. 431) recently read a report of their subsequent investigations at the Pan-American Medical Congress, held in Havana, Cuba, February 4 to 7, 1901. Their recent investigations have been directed toward ascertaining the mode of transmission of the disease from individual to individual rather than toward studying the specific agent of the disease. In their previous report they concluded that the mosquito (*Culex fasciatus*, Fabr.) was responsible for the transmission of the disease. This later work was undertaken largely with the object of confirming these conclusions if possible.

In order to eliminate all possibilities of the disease being contracted from any other source they established a camp, which they called Camp Lazear, in honor of their late colleague, in an open field one mile from the town of Quemados, Cuba. The camp was established on November 20, 1900, after which time it was strictly quarantined, the only persons allowed to leave or enter the camp being three immune members of the detachment and the members of the board. The personnel of the camp consisted of two physicians, one of whom was immune; one immune hospital steward; nine privates of the hospital corps, one of whom was immune, and one immune ambulance driver. A few Spanish immigrants were admitted to the camp from time to time during the investigation. Before the experiments were begun all non-immune individuals were kept in the camp longer than the full period of incubation of yellow fever.

Six non-immune persons were allowed to be bitten by mosquitoes (*Culex fasciatus*) which had previously bitten yellow fever patients. Of these six individuals five contracted yellow fever within the period of incubation of the disease. The negative result was in a case which had been inoculated with a mosquito on the fifteenth day after the insect had bitten a case of yellow fever on the third day. They have an explanation for this negative result, however. They subsequently found that in the case of an insect kept

at room temperature during the cool weather of November, fifteen or eighteen days is, in all probability, too short a time to render it capable of producing the disease. Their observations indicated that it takes a certain number of days after the parasite has been taken into the mosquito's stomach before it reaches the salivary glands of the insect and before it can thence be reconveyed into man. This period averages twelve days in summer and eighteen or more days during the cool winter months.

Having, in their minds, conclusively shown that yellow fever can be transmitted by the mosquito they endeavored to ascertain whether it can be conveyed in any other way. Accordingly four individuals were inoculated with blood taken from the general circulation of patients in the acute stage of yellow fever. Three of the four cases developed yellow fever.

They then proceeded to ascertain whether yellow fever can be conveyed by fomites. For this purpose a small frame house consisting of one room 14 x 20 feet was constructed. It was made in such a way as to exclude direct sunlight and mosquitoes. For twenty nights a non-immune physician, Dr. R. P. Cooke, and two non-immune privates of the hospital corps slept in this building. Each night they unpacked and in the morning repacked three large boxes filled with sheets, pillow-slips, blankets, etc., contaminated by contact with cases of yellow fever and their discharges. These articles were hung about the room during the night, and also placed on the bed occupied by Dr. Cooke. At the end of twenty days these three individuals were placed in quarantine for five days and then given their liberty. None of them had developed yellow fever. Subsequently four other individuals for periods of twenty days either slept in the sheets or night clothing which had been contaminated by the discharges of yellow fever patients without contracting the disease.

They then proceeded to demonstrate how house infection with yellow fever occurs. A house similar to the previous one was constructed, only full provision for light and ventilation was made. It was divided into two compartments separated by a wire screen. All articles admitted to this building were first carefully disinfected. In one of the compartments fifteen mosquitoes previously infected by biting yellow fever patients were set free. Two individuals were admitted to the compartment with the mosquitoes and were bitten. One of the two developed yellow fever.

The authors state that at Camp Lazear of seven non-immunes whom they attempted to infect by means of the bites of contaminated mosquitoes they have succeeded in conveying the disease in six, or 85.7 per cent. Out of a total of eighteen non-immunes whom they have inoculated with contaminated mosquitoes, since they began their investigations, eight, or 44.4 per cent., have contracted yellow fever.

The conclusions from their investigations are as follows :

1. The mosquito—*c. fasciatus*—serves as the intermediate host for the parasites of yellow fever.
2. Yellow fever is transmitted to the non-immune individual by means of the bite of the mosquito that has previously fed on the blood of those sick with this disease.
3. An interval of about twelve days or more after contamination appears to be necessary before the mosquito is capable of conveying the infection.

4. The bite of the mosquito at an earlier period after contamination does not appear to confer any immunity against a subsequent attack.

5. Yellow fever can also be experimentally produced by the subcutaneous injection of blood taken from the general circulation during the first and second days of this disease.

6. An attack of yellow fever, produced by the bite of the mosquito, confers immunity against the subsequent infection of the blood of an individual suffering from the non-experimental form of this disease.

7. The period of incubation in thirteen cases of experimental yellow fever has varied from forty-one hours to five days and seventeen hours.

8. Yellow fever is not conveyed by fomites, and hence disinfection of articles of clothing, bedding, or merchandise, supposedly contaminated by contact with those sick with this disease is unnecessary.

9. A house may be said to be infected with yellow fever only when there are present within its walls contaminated mosquitoes capable of conveying the parasite of the disease.

The Pathology of Herpes Zoster and Its Bearing on Sensory Localization.—HEAD and CAMPBELL (*Brain*, Part III., Autumn, 1900) have recently published a most exhaustive and painstaking study on the above subject. In their introduction to the subject they state that they have determined the pathological lesion which underlies this disease, and have attempted thereby to determine the cutaneous distribution of certain fibres that enter each posterior root ganglion. Bärensprunz, in 1861, was the first to state that herpes zoster was of nervous origin. He was fortunate to secure an autopsy on a case, the study of which led to the universally accepted view that the herpes was associated with a lesion of the posterior root ganglion. The writers point out that although Bärensprunz rightly placed the lesion in the posterior root ganglion, he thought that this structure stood in no connection with the fibres of the posterior root or peripheral nerve, but had special nerve fibres of its own. Up to the time at which Head and Campbell commenced to investigate the pathology of herpes zoster there had been only two well reported autopsies on cases of zoster ophthalmicus and five satisfactory reports on zoster of the trunk. To this number they themselves add twenty-one cases at all stages after the eruption. The authors divide their report into three parts. In Part I. they take up the pathology of herpes zoster.

The changes in the ganglion of the posterior roots vary according as to whether they are acute or chronic. The acute changes consist of (1) extremely acute inflammation with the exudation of small round deeply-staining cells; (2) extravasation of blood; (3) destruction of ganglion cells and fibres; (4) inflammation of the sheath of the ganglion. If severe such a condition eventually leaves a scar in that part of the ganglion affected and leads to thickening of the sheath over the affected area. On the other hand, if the eruption has not been severe all traces of the inflammation present in the acute stage may pass away, leaving the ganglion apparently normal.

The changes in the posterior nerve roots are somewhat similar. They consist of an acute degeneration followed by a greater or less amount of secondary sclerosis according to the severity of the acute destruction. The anterior root was always normal.

In the peripheral nerves they state that degeneration seems to appear, to disappear, and to be replaced by sclerotic changes at the same periods after the initial lesion in the ganglion, as was the case with the posterior roots.

The changes in the spinal cord are practically the same as those which follow division of a posterior root or excision of a posterior root ganglion experimentally. There is an acute degeneration of the root fibres in the posterior column of the cord from the point of entrance of the fibres from the involved root.

Zoster of the branches of the trigeminal is associated with a similar lesion in the Gasserian ganglion to that found in the posterior root ganglion in cases of zoster of the trunk and limbs. This lesion causes secondary degeneration in the sensory root of the Gasserian ganglion, both in its extramedullary and intramedullary course.

The authors state that a herpes zoster, in all respects resembling that arising spontaneously, may be produced by implication of a posterior root ganglion in inflammatory processes secondary to malignant disease, tubercle or injury. They also refer to the occasional appearance of herpes in cases of organic diseases of the nervous system. A short chapter is devoted to a consideration of the changes in the skin and lymphatic glands. They point out the curious fact that although the serum of the vesicles is sterile yet there is enlargement of the associated lymphatic glands.

An interesting chapter is devoted to a discussion of herpes zoster as an acute infectious disease of the nervous system. It has its prodromal period in which fever and pain may be the only symptoms. With the appearance of the rash the disease declares itself. They compare the disease to acute lobar pneumonia. The rash in herpes appears generally on the third or fourth day, just as the physical signs of pneumonia become well marked usually on the third or fourth day. Other evidences in favor of the infectious character of the disease are the infrequency of second attacks, and the occurrence of definite epidemics. They have met with only four instances of second attacks in over four hundred cases, and they have repeatedly noted the tendency of the disease to prevail at certain periods.

They draw an analogy between anterior poliomyelitis and herpes zoster. Just as in the former the unknown poison picks out the motor cells in the anterior horns, so in herpes zoster the unknown poison selects the posterior root ganglia. From a table compiled from 392 cases they show that the ganglia most commonly affected are those which receive afferent impulses from the viscera through the white rami of the sympathetic. The posterior root ganglia contain two types of cells, large, coarsely-granular nerve cells and smaller more pear-shaped cells, which stain more uniformly with methylene-blue. They find that in herpes zoster the ganglia which are most frequently involved are those which contain a preponderance of the small cells, which give rise to the shorter fibres of the posterior columns of the cord. These small cells, among other functions, are believed to subserve pain, as Münzer has shown that the long tracts of the posterior columns do not conduct pain impressions to the cerebrum. Hence the intense pain which accompanies an attack of herpes zoster. They do not believe that the eruption of herpes zoster is produced by disturbance of special trophic nerves, but by intense irritation of cells in the ganglion which normally subserve

the function of pain, and more particularly that form of pain produced by afferent visceral impulses.

In Part II. the writers discuss the bearing of the distribution of the eruption in herpes zoster on sensory localization. Before they began this research Head had collected a large number of cases of herpes zoster, and had constructed a diagram to show the relation that the areas occupied by the eruption bore to one another. A series of segments was thus mapped out upon the surface of the body, and to each segment was given a hypothetical number which was supposed to represent its numerical localization in the central nervous system. This numerical localization met with universal disbelief alike from anatomists and clinicians, and Head felt that if a post-mortem could be obtained on a case of herpes zoster in which the distribution of the eruption had been carefully drawn or photographed the question might be settled one way or another. Head and Campbell eventually were able to secure autopsies on twenty-one cases of herpes thus previously studied. This material has enabled them to deal with the question of numerical localization in a complete manner. In their diagram and in the text the name used to designate the skin areas refer to a definite posterior root ganglion. Thus "the fourth dorsal" area means that that area corresponds with disturbance of the fourth dorsal ganglion. The clinical study of these cases, with the confirmation obtained from the post-mortem, showed that their original diagram of the areas was in its main essentials correct. They show that these areas may vary markedly in different individuals, owing to variations in the surface from stretching of the skin, as in the mammary region, without any necessary alterations in nerve supply.

In conclusion, they believe that when a certain ganglion is affected the eruption most frequently lies over a definite tract of skin, which may be called the normal area from which fibres enter that ganglion. This tract of skin may, however, in some cases be situated further headwards, and occupy about one-half or less of the area usually supplied by the segment in front (pre-fixed). It may be situated further toward the "tail end" of the body (post-fixed) to the same extent. But its displacement never exceeds half an area in either direction, and in no case did they find that an eruption, which lay over what they supposed to be the complete normal area of a certain segment, was produced by a lesion of either the ganglion above or the ganglion below. They found, further, that the areas marked out by the eruption of herpes zoster overlap one another to a very variable extent. On the trunk this overlap was slight when individual differences and variation in nerve supply were taken into account. In the neck the overlap consisted more of a sharing of a certain territory than of true overlap, but on the limbs the overlapping was distinct. In no case did the overlap equal in extent more than one-half of the area above and below, while in many cases it was considerably less.

Part III. contains the clinical and post-mortem reports of their twenty-one cases of herpes zoster in which they secured autopsies, and from which they drew their conclusions already given. The report is accompanied by numerous figures and seventeen plates.

SURGERY.

UNDER THE CHARGE OF

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Prophylaxis in Asepsis.—HAMMESFAHR (*Centralblatt für Chirurgie*, November 24, 1900) states that, as the result of the experiments which have been performed for the perfection of the customary methods of disinfecting the hands, one must acknowledge that the hand infected with virulent micro-organisms cannot be disinfected by the usual methods of disinfection so that it cannot become infected again. It is comparatively easy for the operator and his assistants to avoid infection by wearing rubber gloves and taking care to remove all infected dressings with sterilized forceps. The examination of suppurating wounds, the vagina, and the rectum should always be made with the examining fingers protected by rubber finger-cots; in all septic operations or in the washing out of infected wounds the operator and his assistants should wear rubber gloves. These gloves in order to be useful must not interfere with the touch, should fit tightly, and must be durable and capable of being absolutely sterilized. When the hands of the operator and his assistants are so protected from infection it is possible so to disinfect the hands in the case of an aseptic operation that from their side the danger of infection is practically *nil*. In difficult and delicate aseptic cases—in contradistinction to the septic—the gloves may be a hinderance. Also one need not avoid so assiduously touching the wound with the hand, as Steinthal and more lately König have recommended. Certainly each unnecessary touch or handling of the wound is bad, but every surgeon knows that the finger in many cases cannot be replaced by an instrument. Not only should the surgeon's hand be prevented from coming in contact with the septic materials, but he should also take care of the skin and nails. It is self-evident that a hand with a smooth surface and carefully cleansed nails is easier to sterilize than a rough hand. As Gottstein has stated, "A female hand is more easily disinfected than a male hand."

The Treatment of Fractures of the Patella.—WIENER (*Centralblatt für Chirurgie*, January 5, 1901) states that fractures through the quadriceps muscle do not heal without artificial aid. The union of the fractured parts, near the muscle, is hindered by the great mass of liquid exudate upon which the fracture is in a measure supported. The treatment of opening the joint and evacuating the exudate, then bringing the fragments together by sutures,

has two disadvantages: the necessity of securing absolute asepsis and the difficulty of securing the patient's consent to operative interference. The author's method of treatment consists in covering in the leg with a bandage, then applying a plastic-fibrous splint around the affected knee. The knee is then surrounded by a generous layer of cotton, and then a rubber bandage 8 to 10 cm. wide is tightly applied. The patient is then able to walk with but slight difficulty, even though at this time there is not complete approximation of the fragments because of the exudate. The rubber bandage is retained in place for four or five days, and then removed. Examination at this time will show that the effusion has nearly entirely disappeared, and the fragments can be nearly approximated. The bandage is reapplied, but more tightly than at first; interference with the circulation is not to be feared, because the bloodvessels are amply protected by the splint and the cotton. This method causes the effusion to be absorbed very much faster than by the use of massage or any other method. In one case the circumference of the knee was decreased in four days from 43 cm. to 37 cm. This treatment is also very serviceable in cases of acute traumatic arthritis. In one case in which there had been a bad rupture of the ligaments of the inner side of the right knee-joint, three hours after the accident the joint was filled with effusion; fourteen days later the patient could flex his leg to a right angle.

Some Personal Observations on the Effects of Intrapleural Injections of Nitrogen Gas in Tuberculosis.—LOOMIS (*New York Medical Record*, September 29, 1900) states that the gas is best injected with the patient sitting in bed and that the best point of insertion for the needle is behind the posterior axillary line, in about the eighth interspace, the chest being sterilized in the usual manner before the injection is made. The quantity of gas to be injected will vary considerably, and will range from fifty to two hundred cubic inches, the amount varying in each case according to the dyspnoea, distress, irregularity of the heart, and displacement of the mediastinal contents. In no case have any bad results followed the injection. Having injected as much gas as possible, the trocar should be withdrawn and the puncture closed with collodion and a firm compress, and adhesive plaster placed over the compress. Practically no unpleasant effects follow these injections. Respirations are always increased, and the pulse-rate is generally lowered. One of the most constant effects noted after injection is that there will be a marked increase in the expectoration during the first twenty-four hours, and that after the first few days expectoration diminishes rapidly. The gain in weight is usually constant and often excessive. Night-sweats generally disappear as the patient's general condition improves. There is usually marked improvement in the subjective symptoms after the injection, such as diminution in the pulse and expectoration, rapid gain in weight and strength, stoppage of hemorrhages and night-sweats, and improvement of the appetite. The author analyzes his eighteen cases as follows: For pulmonary hemorrhages, eight cases; for effect on lungs, ten cases; with the following results: effect on hemorrhage stopped at once; effect on lung condition, in the majority of cases the physical signs remained the same except that râles diminished or disappeared. Only one case showed a

marked improvement. Pleurisy was controlled at once. The number of cases which gained in weight was sixteen, and the average gain in weight was seven and one-half pounds per patient. No cases lost weight. The average amount of gas injected was 107½ c.c. Improvement was noticed in the cough in thirteen cases, in expectoration in eleven cases, in fever in four cases. The injections were tried and failed, owing to inability to introduce the gas by reason of adhesions, etc., in eight cases. The author states in conclusion that he is convinced that intrapleural injections of nitrogen gas will have a permanent place in the treatment of pulmonary tuberculosis. That it is a treatment that has a future; that in no cases have any bad results or even unpleasant effects followed the injections; that although in no cases has there been an absolute cure of the disease, still there has been an apparent arrest in two cases and a disappearance of such constitutional symptoms as expectoration, fever, and cough in a number more. Sufficient time has not yet elapsed to say whether in even the most favorable cases the activity of the disease may not return. The local improvement is not as apparent as the constitutional. A marked gain in weight was found in every case injected. In not a single case did this method of treatment fail to stop pulmonary hemorrhages.

Large Abscess of the Breast in a Girl, aged Sixteen Years.—MORESTIN (*Bull. et Mém. de la Soc. Anat. de Paris*, December, 1900) reports the case of a girl, aged sixteen years, who had a large abscess of the left breast. There was no pain on examination, and the whole course of the case had been of a non-inflammatory type. The history was that six weeks ago she had received a slight traumatism to the left breast as she was closing a window. This caused her but little pain, but she was in only fair health at this time, and the traumatism undoubtedly produced a favorable soil for the growth of any latent infection. One year before she had had a large abscess of the left axilla which opened spontaneously. She had also had when young an enlargement of the submaxillary and cervical glands. An operation was decided upon as the only means of relieving the abscess, and so an incision was made, and over a litre of pus was evacuated. The patient made an uninterrupted recovery. Examination of the pus showed it to contain only staphylococci, and inoculation of guinea-pigs proved negative for tuberculosis.

The Treatment of Tuberculosis of the Spine.—WIENER (*Medicine*, February, 1901) reports a fatal case in which the autopsy revealed a caseous mass replacing the body of the sixth dorsal vertebra. This mass was covered by fibrous tissue which was easily ruptured. There was no evidence of any pressure on the cord or of any gross change in the dura mater. On the posterior wall of the pleural cavity was a similar mass, not involving the ribs. There were no tubercles in the lung. There was an adhesive pleurisy of the left side, evidently of recent origin, and the left kidney showed several tubercles in the cortex. There were no tubercles in the other organs and the mesenteric glands were only moderately enlarged. What is to be hoped from the treatment of such a case by Calot's method? Where is the bone to come from which is to fill the gap left by the destruction of the sixth

vertebra? With the periosteum mostly gone and the vertebral epiphyses destroyed, we cannot conceive of the formation of those bridges of bone which, as Calot asserts, connect the severed vertebræ. In the year after Calot's publication much was written upon the subject. Now that the time has arrived when final results ought to be known in cases operated on two years ago, a cautious reserve is shown. Forcible correction is indicated in cases in which the deformity is of recent date. In these the operation is easy and is accompanied by little danger. Where paralysis does not yield to milder measures, it may be undertaken as a last resort, though the risk to life is very great. Pean describes the case of a girl, aged fifteen years, with an enormous kyphosis of the upper part of the spine, complicated with paralysis of the lower extremities. She had been treated by stretching for two years without benefit, when forcible correction and immobilization in a plaster jacket was followed by a prompt improvement in the paralysis. The gravitation abscess is both frequent and difficult to treat. There is a temptation to open these abscesses at the most prominent part and evacuate the pus, but this does not reach the seat of the difficulty. It only encumbers the patients with permanently oozing fistulæ, which are usually accompanied by mixed infection and amyloid degeneration, followed by the death of the patient. Such abscesses are rarely accompanied by fever, 101° F. being the highest recorded. The ordinary symptoms of sepsis are not present, and under favorable circumstances absorption may take place. The author has observed in the right iliac fossa of a man, aged forty-five years, a tuberculous abscess the size of a child's head, which disappeared without leaving a trace. In this case there was destruction of the first lumbar vertebra, and the only treatment employed was a permanent extension apparatus. The author states in conclusion that he wishes to urge upon each member of the medical profession to direct his efforts to the end that proper care be taken of the unfortunates afflicted with surgical tuberculosis in hospitals adapted for the purpose.

The Estimation of the Damage and the Source of the Hemorrhage in Cases of Hemorrhage into the Knee-joint.—LAUENSTEIN (*Centralblatt für Chir.*, February 9, 1901) states that several methods of treatment have been recommended. Among these are the "ambulant" method, the "expectant" treatment, treatment by massage, etc. Other surgeons recommend the immediate evacuation of the bloody effusion. In many cases it is difficult or impossible to accurately determine the exact amount of injury that the joint has sustained, as the effusion soon masks all physical signs, and it is impossible to tell the extent of the rupture of the capsular ligament. The author's treatment has been to evacuate the effusion as soon as possible, then to apply a tight bandage and maintain the joint at rest for several weeks. The patient is not allowed to walk nor are passive motions begun until sufficient time has elapsed for the capsular ligament to have completely healed. In those cases where the effusion is complicated by a fracture of the patella or condyle of the femur, it is the author's custom to evacuate the effusion before putting the joint at rest in splints. The only method of removing the effusion from the joint is by evacuation, either through an incision or by the use of a trocar and canula. The advantage of the speedy removal of

the effusion is that the torn edges of the capsular ligament are brought in good apposition, and thus the tendency to rapid healing is promoted. The tear in the capsular ligament is usually in that segment of the joint which is most exposed, which is the part lying to the outer side of the patella. After evacuating the effusion through a trocar and canula, it is easy to demonstrate the wound of the capsular ligament by introducing a small sound through the canula into the joint. The puncture is best made, as a rule, on the outer side of the joint. The Röntgen rays will be found a valuable aid to diagnosis in all affections of the knee-joint. In all cases of injury of the knee-joint it is most important that good union be secured before any attempt is made to use the joint.

The Treatment of Difficult Cases of Scoliosis.—BADE (*Centralblatt für Chir.*, March 9, 1901) states that the work of the past few years has clearly shown that a proper combination of gymnastics, massage, and braces are the important factors in the treatment of scoliosis. Which type of brace is the best is still to be determined. The old Sayre "corset" of gypsum or plaster-of-Paris has recently been the subject of much favorable discussion. It is usually applied by the method of Calot. This consists in applying the jacket while the vertebral column is forcibly extended, and retaining the jacket for any time up to three months. Schanz has gone energetically forward with the "redressiou" treatment. After correcting the deformity as much as possible, he applies the plaster-of-Paris jacket. After its removal he attempts to retain the correction by means of gymnastics and then the reapplication of the jacket. The author applies the plaster jacket after immobilizing the spine, as a permanent extension of the spine is only possible when the head and the pelvis are included in the fixation. As the patient grows in the gypsum jacket the jacket should be correspondingly enlarged, care being taken that the extension is fully maintained. In order to accomplish this the author uses the apparatus designed by Schede for the treatment of spondylitis. As the children become thinner the deformity of the projection of the ribs becomes larger, or at least it is not reduced. In order to accomplish the reduction of this deformity while the patient is wearing the gypsum jacket, the author advises the use of continual pressure. Wullstein advocates the use of a pressure pad of gauze soaked in plaster-of-Paris, which will not permit of any regulation of the degree of pressure. The author's method consists in the use of a pressure pad that is made in two parts. One plate lies closely to the projecting ribs, while the second plate fits tightly on the inner side of the jacket. These plates are joined together by a screw whose outer end protrudes outwardly. By turning this screw the two plates are approximated and the decrease of the deformity is accomplished. The author believes that his method of treatment accomplishes the permanent self-assisting extension of the vertebral column with the use of a plaster-of-Paris jacket, and the return to normal of the projection of the ribs through the gypsum wrapping.

A Critical Review of the Literature of Gumma of the Spermatic Cord, with the Report of a Case.—GOLDENBERG (*Journal of Cutaneous and Genito-urinary Diseases*, March, 1901) states that syphilitic affections of the

spermatic cord are very rare, and when they occur they generally accompany a syphilitic orcho-epididymitis. A review of the literature shows but nine cases in which the spermatic cord was involved. The author reports the case of a man, aged twenty-three years, who presented himself with a round, sharply circumscribed, hard mass, slightly cystic in feeling, about 2 cm. in diameter, giving a sense of fluctuation, on the left posterior surface of the scrotum, about one-quarter inch from the raphé. Operation was decided upon, and on incision the mass was found to be adherent to the skin by inflammatory exudate and closely connected with the cord. It was not sharply circumscribed, and it had extended somewhat into the surrounding tissues. A pathological report proved the tumor to be a gumma with secondary inflammatory changes.

PEDIATRICS.

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Uricæmic Headache in Children.—CAUSSADE (*Thèse de Paris*, July, 1900) details four unpublished observations upon this condition and describes the syndrome. The crises of this cephalalgia approach migraine. The child comes of arthritic stock, but beside hereditary influence the diet is also in part responsible. The urine shows a high percentage of urea and an excess of uric acid and alkaline urates; sometimes, also, there are traces of albumin. Beside uric acid analogous bodies are also at fault (xanthine, paraxanthine, and heteroxanthine). According to Rachford, uric acid alone would not be poisonous, but xanthine and its derivatives, which are more soluble than uric acid, are very dangerous.

In all cases uricæmia is a manifestation of arthritism, and is especially liable to appear in the second nutritive period. The diagnosis is difficult. It rests at times upon a study of individual temperament and family antecedents. Treatment is very important; no overfeeding, regular meals, water or milk, white food, eggs, farinacea, cooked fruit, and no red meats. Hefron interdicts soups and extracts of meat, kidney, liver, acid fruits, beer, wine, coffee, tea, and chocolate in advanced cases. Water should be taken in abundance and constipation should be combated. Vegetables containing oxalic acid should be avoided (rhubarb, sorrel, asparagus).

The skin should be kept active by such exercise as is furnished by the bicycle and tennis, and by Swedish movements, and baths followed by friction. As medicines the alkalis are indicated, such as bicarbonate of soda

or potash, citrate of potash, magnesia, carbonate or benzoate of lithium, salicylate of soda, or Vichy water.

The Existence of Ductus Murmurs in the Newborn.—THEODOR ESCHERICH (*Jacobi Festschrift*, 1900, p. 327) relates the case of a newborn infant which presented the usual symptoms of congenital heart disease with rapid and superficial breathing and weak cry. The heart dulness was slightly increased, and there was a loud systolic murmur heard best at the base, but audible all over the chest. The second sound was clear, and marked accentuation of the second pulmonic was not observed. Cyanosis and weakness increased, and the infant died within twenty-four hours after birth. An ante-mortem diagnosis of congenital heart disease had been made. The autopsy showed the heart slightly enlarged but otherwise normal, without valvular lesion. The foramen ovale was closed, but the ductus arteriosus widely patulous. Both lungs showed extensive pneumonia at the bases. Auscultation of the foetal heart sounds shortly before delivery had noted entire absence of murmurs. The author, therefore, believes that the murmur heard during life was produced by the stream of blood passing through the ductus arteriosus. He has observed a number of weakly and premature infants in whom weak superficial respiration has been a frequent symptom. These infants have frequent attacks of complete cessation of respiration with deep cyanosis. These attacks at first occur during or after feeding, or even without any apparent cause, at first rarely, but later more and more frequently until death occurs in one of them.

The attack usually begins with cyanosis, which increases steadily during the suspension of respiration; it terminates spontaneously through irritation of the respiratory centre by CO₂, or after the application of irritants or artificial respiration. In one of these cases during the suspension of respiration the author was able to observe a distinct systolic murmur in the pulmonary area, which was not present during regular respiration and at the beginning of the attack, but was very distinct at the height of the asphyxia. He believes this murmur to have been produced in the ductus arteriosus by increased pressure in the pulmonary artery with a fall of pressure in the general arterial system, causing a current of blood to flow through the ductus. When respiration was re-established the pressure in the two arteries became equalized and the murmur disappeared. This he thinks the most plausible explanation of the intermittent character of this murmur, especially since examination of other infants during such attacks failed to reveal a murmur of this character.

The treatment of cases of this kind should consist in systematic stimulation of the respiratory centre by the Schultzze method several times a day.

A Case of Apparent Recovery from a Congenital Abnormality of the Heart.—JOHN THOMSON, of Edinburgh (*Archives of Pediatrics*, March, 1901, p. 193) reports an interesting case under this title, which was brought to mind by reading Escherich's paper "On the Existence of Ductus Murmur in the Newborn" in *Jacobi's Festschrift*, an abstract of which appears in this department for the present month.

The patient was a girl, aged nine weeks, the tenth child of apparently

healthy parents. Five of the other children had died in infancy or early childhood from various ailments, and one in adolescence from phthisis. The other three were living and in good health. The mother had had little rest during her pregnancy with this last child, but had not been ill. The baby was small and slept more than usual, but otherwise she had seemed normal. When first seen by the reporter she had slight bending of the ribs, and the hands, feet, and face, especially the lips, were distinctly cyanotic. The pulse was very rapid (156) and small, but regular, the respirations 36; the lungs and abdominal organs appeared to be healthy. The blueness of the extremities was noticed to vary in degree and to be worse when she cried.

The apex-beat was very indistinct, and was situated in the left fourth interspace about one-third of an inch outside the nipple line. No thrill could be felt, and no enlargement to the right could be detected. A loud systolic murmur was heard most distinctly over the base, especially to the left of the sternum, but was also audible in the other areas, in the axilla, and in the interscapular regions. The pulmonary second sound was normal and not accentuated. No clubbing of the fingers. Two months later, after regulation of the feeding, the child seemed better, and it was reported by the mother that she no longer turned blue, and on examination only very slight cyanosis of the feet and legs was noticed. The murmur was distinctly less loud, and over the tricuspid area it was quite inaudible.

Seven years after this the child showed no trace of cyanosis, and there was no clubbing of the fingers. The murmur had disappeared, the pulse was normal in rate and rhythm. No abnormality of the heart could be detected.

The author considers this to have been a case of patent and perhaps dilated ductus arteriosus corresponding with those described by Escherich.

General Emphysema Complicating Measles.—DAVID J. EVANS (*Montreal Medical Journal*, January, 1901, p. 8) reports this interesting condition in a boy, aged four years. The child was admitted to the hospital with a temperature of 102°, respirations 30, and pulse 148, with the rash well marked over the face and chest. The heart was normal, and a moderate bronchitis was present. The left ear was discharging, but this had been the case for some weeks before measles developed. The disease ran a moderately severe course. The cough, while troublesome at times, was never severe or paroxysmal.

Five days after admission the respiration became rapid and shallow, but no pneumonic areas could be detected. On the sixth day a diffuse swelling appeared in the left supraclavicular region, which was soft, non-crepitant, and evidently painless. Complete aphonia was also noticed. Next morning the swelling was found to have extended in all directions, though chiefly downward over the sternum as far as the fourth rib, and distinct crepitation could now be detected. Respirations were rapid and shallow, and the face was swollen and somewhat cyanotic. Later, crepitation could be obtained over the whole head, back, abdomen, and left arm, and extended down the left thigh as far as the knee. Temperature varied between 102° and 104°. On the eleventh day of the illness, under supporting treatment with whiskey and strychnine, the general condition was somewhat improved, though the

emphysema remained unchanged. As the general condition continued to improve the emphysema gradually disappeared, and on the thirteenth day the voice returned, but crepitation could be obtained in various areas for some days thereafter. Eventually complete recovery resulted.

THERAPEUTICS.

UNDER THE CHARGE OF

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Pharmacology of Anagyrine.—DR. OTTO LOEWI has reinvestigated the alkaloid found in *anagyris fatida* which was formerly held to contain eystine and to have a strychnine-like action. He has found that there are probably two alkaloids, and that one, anagyrine, on which the investigations were made, more closely resembles lobeline, the alkaloid of Indian tobacco, than any other body; it is not, however, identical with this alkaloid. Its place in therapy is still to be determined.—*Archives Internationelles de Pharmacodynamie*, 1901, No. 8, p. 65.

Therapeutic Uses of Thyroid Extract.—DR. GEORGE R. MURRAY reviews the results which the ten years' use of thyroid gland in therapeutics has given. As is well-known, the function of the thyroid, among other things, is to form an internal secretion, the colloid material, which passes from the alveoli into the lymphatics of the gland, and is thus conveyed into the general blood stream, by which it is distributed to all parts of the body. This secretion plays an important part in the general metabolism of the tissues, which is but imperfectly performed when the supply of the secretion is absent or insufficient. The chief sphere of usefulness, therefore, is in the treatment of those conditions in which there is disease or destruction of the gland. Of the forms of administration the author says that the raw, fresh gland of the sheep may be given finely minced and mixed with glycerin, the usual dose being from one-eighth to one-quarter of a lobe. The liquid thyroid or the dried gland may also be employed; the dried gland is perhaps to be preferred. Myxœdema is conveniently treated in two stages. During the first the object is to get rid of the symptoms and then restore the patient to health. During the second stage the degree of health arrived at by the first course of treatment must be maintained. In the first stage of an acute attack of myxœdema it is advisable to keep the patient in the house or even in bed

if there is any evidence of cardiac degeneration. The amount of thyroid should range from one-half grain a day upward. The second stage of the treatment lasts as long as the patient lives. Here it is advisable to ascertain the amount of gland substance daily elaborated and to keep this supply up by artificial means. In the treatment of cretinism much the same line must be pursued. Small doses should be given in the beginning. In some cases of goitre thyroid is of service, in others it is of little or no value. In the simple parenchymatous goitre of adolescents and young adults it is particularly useful. In some skin diseases it has been found of service. Psoriasis, ichthyosis, and tertiary syphilis have been benefited.—*Practitioner*, 1901, vol. lxvi., p. 389.

DR. P. BLAIKE SMITH records the results of therapy by thyroid extract in three interesting instances. The first patient was a woman, aged forty-four years, who had great general weakness and who on examination showed disseminated nodules studded over the entire front of the chest, neck, thorax, and axillæ. These nodules were carcinomatous and there was a carcinomatous ulcer of the breast. Five grains of thyroid extract were given twice a day and taken persistently for six months, being interrupted occasionally by cardiac symptoms. At the end of six months the nodules over the chest anteriorly and laterally and those of the abdominal wall had disappeared entirely. The patient had gained in weight and was much improved throughout. After stopping the use of the thyroid the nodules gradually returned, and three months after their disappearance as many as one hundred and fifty had returned. Thyroid medication again brought about improvement, but the general condition was approaching the terminal carcinoma stage and little was hoped for, although the progress of the malady seemed to be somewhat retarded. A second patient showed a peculiar skin eruption of a papulobulbous character, which was recurrent and persistent and not identified as any of the well recognized skin affections. This patient made a complete recovery on thyroid extract, one-half grain three times a day. The third case was one of obesity occurring in a man, aged fifty years, who had chronic Bright's disease in addition, and who, moreover, disregarded all dietary and other regimen. Five-grain doses of thyroid three times a day reduced his weight very materially.—*British Medical Journal*, 1901, No. 2098, p. 388.

Suprarenal Extract in Hæmoptysis.—DR. W. B. KENWORTHY has obtained excellent results in pulmonary hæmoptysis by the administration of suprarenal extract in three-grain doses given every half hour until nine grains are taken; then one every two hours until nine grains are taken; then three grains daily for a week. The powder is best taken dry on the tongue, mixed with saliva and swallowed with water. In fourteen instances in which suprarenal was employed it controlled the hæmoptysis in every instance. In one patient only did the hæmorrhage continue for more than fifteen minutes after the administration of the first powder.—*Medical Record*, 1901, vol. lix., p. 415.

Active Principles of Digitalis Leaves.—DR. J. W. ENGLAND gives a fair summary of the recent work done on digitalis, closely following Dohme's

recent critical *résumé*. He contributes a new feature to the discussion in the preparation of a fat-free tincture. It has not the acrid taste of the official tincture, and, unlike the latter, remains transparent on dilution with water. Its action, clinically, develops fifteen to forty-five minutes more rapidly than that of the official tincture, as it is more readily absorbed. He further maintains that digitoxin is not the chief therapeutic agent in the leaves.—*New York Medical Journal*, 1901, vol. lxxiii., p. 573.

Sodium Salicylate in Diabetes Mellitus and Glycosuria.—DR. R. T. WILLIAMSON has been observing for the past ten years the results of the use of sodium salicylate in the treatment of diabetes as originally recommended by Ebstein. In the earlier years his experiments were tentative and small doses only were employed. His results at that time were but nominal, but the patients all claimed that they felt better during the period of time of its administration. Within recent years he has been increasing the dosage and now reports on twenty patients, some of whom, being in hospitals, were carefully followed. The results obtained, diet and regimen being the same, seemed to prove that sodium salicylate in large doses, seventy-five to eighty grains daily, does have a marked effect in diminishing the amount of sugar in the urine. Stopping of the drug would cause the sugar to reappear, to disappear on resuming the medication. The author does not regard it as a specific, but claims that it is a useful adjuvant. Certain patients do not take kindly to its use. These need careful observation.—*British Medical Journal*, 1901, No. 2100, p. 761.

Superheated Dry Air.—DR. FR. NEUMANN advocates the use of superheated dry air (Tallerman) in the treatment of sciatica, arthritis deformans, and scleroderma. In specially adapted instruments the temperature may be raised to 300° F. without danger to the patient. The general stimulation of the circulation and of the respiratory excretion are the avenues of greatest action, and the marked stimulation of the lymphatic channels leads to more vigorous nutrition of the affected parts. It is not wise to look for immediate results in the use of superheated air. The affections usually treated are notoriously chronic, and have been developing for a long period of time, hence the processes of repair once started in the right direction may take a correspondingly long time to bring about the desired results. The author gives the histories of a number of patients which are reported as cured.—*Lancet*, 1901, vol. clx., p. 923.

Sodium Cinnamate in Tuberculosis.—DR. A. KUHN states that in view of the fact that the composition of balsam of Peru is not constant, especially in the amount of its cinnamic acid, the more stable product of sodium cinnamate has been introduced in Landerer's method of injection treatment for tuberculosis. He reports on the results obtained with this preparation. He employed 10 per cent. solutions which were injected directly into a vein of the forearm in beginning doses of one-eighth of a grain every other day. The dose was gradually raised according to the general condition. Eleven instances are reported in full. The results were on the whole satisfactory.—*Münchener medizinische Wochenschrift*, 1901, vol. xlviii., p. 453.

Urea in the Treatment of Tuberculosis.—DR. H. HARPER has for the past year and a half been using pure urea in a large number of cases of different forms of tuberculosis, and believes it to be superior to any remedy which is used for this disease. He reports a number of clinical histories to support his views. The urea is given by mouth in doses of from forty to sixty grains, and also by hypodermatic injection in about the same amounts. —*Lancet*, 1901, vol. clx., p. 695.

[Inasmuch as the hygienic details were faithfully carried out it may be a question as to the rôle played by urea in the treatment. Confirmation certainly is required. The intrinsic evidence of the writer's paper does not necessarily carry conviction with it.—R. W. W.]

Treatment of Epilepsy.—DR. L. PEARCE CLARK summarizes the present stand-point on this important topic as follows: A combination of diet, regular occupation, and personal hygiene with the bromides gives the best results in treating idiopathic epilepsy; the bromides, singly or combined, still remain the chief sedatives for the epileptic state—in the young epileptic, to secure a possible entire suppression of attacks and ultimate cure of the disease; in the adult, an amelioration of frequent paroxysms and comparative physical and mental comfort. The bromides to be effective in chronic and long standing cases must be given in large daily doses to suppress convulsions, from three to five hundred grains if necessary. They should be given gradually to find the sedative level, at which level it is the physician's principal duty to maintain them. Hot and cold baths, high enemata, alimentary antisepsis, and massage are absolutely essential to successful bromide medication. Bromine is a worthy substitute for the bromides in many cases in which the latter are contraindicated and cannot be given in high dosage. Salt starvation or semi-salt starvation is a great adjuvant to the bromide treatment, and should be thoroughly tried in all cases in which bromides or bromine are apparently contraindicated before they are discarded.—*Medical Record*, 1901, vol. lix., p. 46.

A New Remedy for Gout.—DR. H. STERNFELD reports on having had excellent results in the treatment of gout by a new synthetic preparation, a lithium salt of chinic acid, and termed urosin by the manufacturers. The remedy is given in seven-grain doses three to six times a day and reduces the heat, redness, and swelling very quickly. The remedy is very sour, and should be put up in a form to protect the teeth.—*Münchener medicinische Wochenschrift*, 1901, vol. xlviii., S. 260.

On Hedonal.—DR. E. MÜLLER, assistant to Dr. Emminghaus at the Psychiatric clinic in Freiburg, says, *apropos* of this new hypnotic, belonging to the urethane group, he employed it in twenty-nine patients in all, making one hundred and twenty observations, using from seven to seventy-five grains. As it is soluble with difficulty and has a persistent taste it is wiser to give it in wafers or capsules. This delays its action somewhat, however, and to those patients who are not particular regarding the taste of their medicine it may be given with a minimum quantity of wine, soup, or cold water. The less the amount of fluid in the stomach the more prompt will be the action

of the drug. As to the dosage, it is wiser to begin with smaller amounts, seven to fifteen grains, and increase gradually. Sleep usually comes on in from one-fourth to one-half an hour in those rapidly influenced, while in others hypnotic action is not evident for from one-half to one hour. In some it fails to act even when given in seventy-five grain doses. The author concludes that for mild cases of insomnia it is a particularly valuable hypnotic, without any unpleasant by-effects, but as yet its high price makes it almost prohibitory. He compares it, for asylum work, with paraldehyde, in favor of the latter.—*Münchener medicinische Wochenschrift*, 1901, vol. xlviii., S. 383.

Treatment of Acute Dysentery.—DR. W. J. CRUIKSHANK believes that magnesium sulphate is a specific in the treatment of acute dysentery. He advises its administration in drachm doses every three hours, dissolved in one or two ounces of distilled water, to which should be added ten drops of the dilute or aromatic sulphuric acid. This medication should continue until the stools commence to take on a biliary character, when the medication should be withdrawn gradually. Three to six days is usually sufficient to establish convalescence.—*New York Medical Journal*, 1901, vol. lxxiii., p. 403.

On the Use of Formalin Administered in Glycerin.—DR. ALFRED C. JORDAN speaks of the disadvantages of formalin in clinical work because of the intense irritation it produces, and makes the valuable suggestion that this difficulty can be overcome to a great extent by using glycerin instead of water as a solvent medium. A mixture of from 1 to 4 per cent. of formalin in glycerin will keep for several weeks, but it is best to prepare it fresh every once in a while by mixing one to five minims in two ounces of pure glycerin. The author has found it very useful in applications to the throat, as a mouth wash, as an application to the skin, and as an urethral injection in gonorrhœa. In this latter disease, however, while excellent results were obtained, there was much pain and swelling after the injection.—*Lancet*, 1901, vol. clx., p. 467.

Some Fallacies in Therapeutics.—DR. GEORGE L. PEABODY has contributed a critical paper on slavish adherence to antique therapeutic dogmas that have little or no justification in modern therapeutics. Thus on the question of bitters as stimulants to digestion he shows that they have almost no action whatever, and as now administered in the thousand and one "patents" and "proprietarys" any beneficial action, if present, is invariably due to the alcoholic menstrua in which the bitters are dissolved. He, moreover, "shows up" many of the so-called "tonics" which are nothing more than the equivalents of whiskey and brandy, containing as they do from 25 to 50 per cent. of alcohol. Boric acid is a drug with practically nothing but antiquity to help its claims as a useful agent. It is not a strong antiseptic, and is useless as a disinfectant for instruments, hands, or primary dressings of infected wounds. He also criticises the modern use or abuse of tannic acid. It does not cause contraction of vessels as so frequently taught, but rather a dilatation, and as for its use in diarrhœas it is practically inert.

being transformed into an alkaline tannate in the intestines, in which condition it does not precipitate albumin and is practically valueless. Claims as to its styptic or hemostatic effect on internal organs are therefore illusory and purely a matter of tradition. Ergot as a hemostatic in pulmonary hemorrhage he holds as of little or no service, the great increase in general blood pressure counterbalancing all value that might be derived by reason of its contracting capillaries. Moreover, it is very doubtful if it does contract those of the lungs. Lithium is a drug in which as a solvent of uric acid in the body he has little faith. Most lithium waters are valuable as potable waters, but the lithium present, even if of therapeutic value *per se*, is never present in sufficient quantities to be able to effect any such action. Potassium iodide is a much abused drug, its use being commensurate with our ignorance concerning its action. Its action in the attempt to remove chronic hyperplastic connective tissue formations he believes to be *nil*. Its use in lead-poisoning to aid in the elimination of the metal is unfounded on any scientific study. The author ridicules, and justly, the present prevalent modes of aerial disinfection of rooms, cars, etc. Chlorine and sulphur dioxide gases as frequently used are inefficient, and the attempts at disinfection are little short of being ludicrous.—*Medical Record*, 1901, vol. lix., p. 481.

OBSTETRICS.

UNDER THE CHARGE OF

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Pregnancy at Third Month; Fatal Peritonitis from Pus Discharged Through Fallopian Tube.—GOSSET and MOUCHOTTE (*Annales de Gynecologie et d'Obstétrique*, 1900, No. 19) report the case of a patient, aged twenty-six years, in the third month of her fifth pregnancy. She had suffered for some time from salpingitis upon the right side, and had been treated by ennetting and external applications. She was seized with violent pain in the right lower portion of the abdomen, with a slight bloody discharge from the uterus. The symptoms pointed strongly to appendicitis complicating pregnancy.

On abdominal section seropurulent fluid of fetid odor was found in the peritoneal cavity. The appendix and surrounding tissues were covered by a pyogenic membrane, but the appendix was healthy. The uterus was three months pregnant; the right Fallopian tube was bathed in pus, and when freed from adhesions pus was seen oozing from the abdominal orifice of the tube. The tube and ovary of the right side were easily ligated and removed and the abdomen closed, with drainage. The patient died of exhaustion after aborting.

At autopsy, upon examining the tube, purulent peritonitis was found, the abdominal orifice of the tube being patent and pus passing freely from the tube into the peritoneal cavity.

[This case brings to mind the clinical fact that a latent salpingitis may become active during pregnancy, and that the infective focus in the tube takes upon itself increased virulence and activity. This case also demonstrates the fact that the tube remains patent in many cases of salpingitis, and that fluid may pass through this channel into the peritoneal cavity.]

Hæmatoma of the Abdominal Wall Complicating Pregnancy.—In the *Centralblatt für Gynäkologie*, 1901, No. 10, STOECKEL reports two cases of this unusual condition from the clinic at Bonn.

The first was that of a multipara who was admitted to the hospital at the seventh month of pregnancy. There was upon the right lower portion of the abdominal wall a tumor giving indistinct fluctuation, whose precise nature could not be ascertained. The urine of the patient was highly albuminous, and a few days after admission she had a profuse hemorrhage. On examination the os was found nearly dilated and a large placenta presenting. This was removed and a dead child extracted by version. After the patient recovered from her confinement the tumor was incised and found to be a hæmatoma. The clot was evacuated and the patient recovered.

His second case was that of a multipara attended by a midwife who thought the patient pregnant with twins. A tumor remained in the right lower portion of the abdomen after the birth of a child. The midwife attempted to extract a second child from the womb, but could find none. On examination a tumor of indistinct fluctuation was present. When the patient recovered from her labor this tumor was incised and found to be a hæmatoma. It seemed to be in the sheath of the rectus muscle, and was complicated by small points of hemorrhage from the surrounding tissue.

It is difficult to apprehend in these cases the active cause for the formation of the tumor. In the first patient pronounced albuminuria with degeneration of the placenta and hemorrhage were present and would explain a tendency to hemorrhage. In the second case the manipulation of the midwife in attempting to extract a second twin might have been the cause of the formation of the tumor.

The Use of Lysoform to Disinfect the Hands.—STRASSMANN (*Centralblatt für Gynäkologie*, 1901, No. 11) describes his observation upon lysoform as an antiseptic. In solutions of 3 per cent. it destroyed the most malignant bacteria in thirty hours. The bacillus coli communis was rendered incapable of growth in ten minutes by a 2 per cent. solution. In 3 per cent. solution lysol destroyed the proteus vulgaris as quickly as bichloride of mercury 1:1000. Lysoform in 5 per cent. solution was as active as 3 per cent. solution of lysol or 1:1000 bichloride of mercury. The staphylococcus pyogenes aureus and streptococci were destroyed by 3 per cent. lysoform in about the length of time required by bichloride of mercury 1:1000. At the expiration of two hours cultures of these bacilli placed in lysoform, 3 per cent., had been destroyed.

The advantage claimed for lysol and lysoform is that both are naturally

lubricant in their properties and that both leave the mucous membrane or the skin in a smooth and slippery condition. They are especially convenient in obstetric operations where delivery is made through the vagina for this reason. In the routine work of a maternity, where the hands are continually disinfected with soap and bichloride, they must become roughened and cracks and fissures result, which are a source of danger to patients and attendants as well. The lack of poisonous and irritant properties in lysol and lysoform makes them especially adapted for obstetric work.

Spontaneous Intrauterine Amputation.—In Rossthorn's reports (*Zeitschrift für Heilkunde*, Band xxi., N. F., Heft 12) KERMAUER reports the case of a child delivered by craniotomy through a contracted pelvis in brow presentation. Upon examination the great toe of the right foot had been amputated, and at the stump was found a radiating scar covered by a small crust. At the insertion of the cord upon the placenta there was a sac whose wall joined the sheath of the cord. This was an offshoot from the amnion, and had been the portion which adhered to the toe of the child and finally produced the amputation.

Two Cases of Cæsarean Section.—WILLIAMS (*American Journal of Obstetrics*, March, 1901) describes the case of a rachitic dwarf with eclampsia, who was at full term and practically in labor. Cæsarean section was performed and the child successfully delivered. The patient had no convulsion after delivery, and under the copious use of salt solution given beneath the skin she recovered.

His second patient was a pregnant woman in whom tumor of the uterus complicated the condition. Upon section the tumor was found adherent to the right horn of the uterus, and had become tightly wedged in the pelvis and adherent to the intestines. Adhesions were separated, a crucial incision was made into the uterus, and the tumor removed. Two additional growths of large size were found in the lateral wall of the uterus. The womb was accordingly emptied and a total extirpation made. On examining the larger tumor a cavity was found in its centre containing blood, pus, and débris. The mother and child made uninterrupted recoveries.

Pregnancy in a Rudimentary Horn of the Uterus.—In the *Archiv für Gynäkologie*, 1901, Band lxii., Heft 3, KRULL reports four cases of pregnancy in a rudimentary horn of the uterus. All four were treated by operation, and from these cases Krull makes the following observations:

He believes that uterus bicornis, with good development of the muscular and vascular tissue but with atresia or stenosis, comprises one of these classes of cases. The other class consists of those having a rudimentary development of one uterine cornu. In the first class should be included those cases which rupture after the seventh month or in which the patient goes to term or in which the fœtus is retained beyond the usual termination of pregnancy. In the first, second, and fourth of his cases the connection between the uterine rudimentary portion and the remainder of the womb was solid and impervious. In the first case the corpus luteum was on the side of the well developed portion of the womb, while in the second case it was on the same side

as the malformed portion. In the first case migration of the elements of conception had occurred. In the fourth case the situation of the corpus luteum could not be determined. In the third case the connection between the rudimentary horn and the remainder of the uterus was still preserved but narrowed, and the ovum had come from the same side as the contracted portion.

During pregnancy such patients suffer from severe pains in the lower abdomen and from vomiting, although in some cases these symptoms are not sufficiently grave to attract attention. Unless deciduous membrane is expelled ectopic gestation may not be suspected. In the first and third cases pregnancy went to its end without rupture. The first case came to its termination at eight months after the usual end of pregnancy. Rupture usually occurs in these cases between the third and fifth month, as illustrated in two of Krull's patients. In each case there was a mechanical reason for the rupture, either in violent exertion or in a mechanical injury.

Menstruation ceased in each case with the beginning of pregnancy, and decidua formed in the opposite side of the uterus in only one case. It was discharged at the end of pregnancy, while in one other case a membrane was discharged following a mechanical injury.

The point of rupture is usually at the highest portion of the foetal sac. It is sometimes a circular tear. In diagnosing these cases it is most important to recognize the band of connection between the uterus and the foetal sac. The thickness and firmness of this band, its origin from the region of the internal os, distinguish this from other varieties of ectopic gestation. It is especially valuable to recognize an empty condition in the other side of the womb. The foetal sac has limited mobility, and is but a little removed from the remaining side.

When diagnosis has been made the only treatment which offers a prospect of success is operation. In Kehler's cases a general mortality of 82 per cent. was observed. The operation is sometimes difficult because it is not easy to control the pedicle, and hemorrhage may be copious. The operator may be obliged to remove the entire uterus. Krull's four cases recovered.

Version and Extraction in Contracted Pelves.—WOLFF contributes to the *Archiv für Gynäkologie*, 1901, Band lxii., Hcft 3, an interesting paper upon this subject, based upon the results obtained in the Charité Polyclinic in Berlin. The operation of version was performed 196 times in 6000 cases of labor. His paper is minute and extensive and may well be studied in detail by obstetricians. His conclusions are embraced in the following statements:

The maternal mortality of these versions was 5, or 2.6 per cent. The cause of death in these cases was as follows: Eclampsia, one; anaesthesia, one; rupture of the uterus, two; septic infection, one. Death from rupture of the uterus or septic infection may properly, we think, be ascribed in some measure to the operation itself. The mortality from sepsis in these cases was 0.5 of 1 per cent.

The foetal mortality was 48, or 24.5 per cent. When this is compared with the low foetal mortality of some other forms of operation it must be regarded as excessive. Wolff describes those conditions most favorable for the performance of version in contracted pelves. They are as follows: The cervix

being fully dilated, the membranes must not be ruptured or must have been ruptured but very recently. If the cervix is not fully dilated it must be sufficiently so to permit the rapid extraction of the child. The internal antero-posterior diameter of the pelvis must be 8 cm. In addition to these points he draws attention to two minor points which influence the difficulty of the operation. A slight contraction in the true conjugate gives a better prognosis than a considerable lessening to 8 $\frac{1}{4}$ or 8 cm. The multiparity of the patient renders the prognosis for the operation much better, because the birth-canal is more easily dilated. There seems to be no essential difference in the prognosis in flat or symmetrically contracted pelvis, provided there be room for the child to pass. Wolff draws attention to the great importance of choosing a favorable time for version. When the cervix is fully dilated and the membranes have not ruptured or have but very recently ruptured the chance is far the best. In 62 of the 196 operations the operator was fortunate in securing this combination of circumstances. The writer calls attention to Olshausen's warning, to avoid cases of extreme pelvic contraction or those of very slight pelvic contraction before the membranes have ruptured, because one can never tell accurately what the patient will accomplish in spontaneous labor.

In a series of fifty-eight cases which presented the conditions favorable for version, 98.3 per cent. of the children were born living. This result compares very favorably with spontaneous labors in the same class of cases.

GYNECOLOGY.

UNDER THE CHARGE OF

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Kraurosis Vulvæ.—JUNG (*Deutsch med. Wochenschrift*, 1900, No. 21) reports four cases treated by excision of the vulva. Microscopically no evidence of hypertrophy of any of the layers of the skin could be detected. As regards the etiology, the writer will not hazard an opinion, except that he is opposed to Veit's theory of previous inflammation due to excessive scratching. One case was complicated with carcinoma of the vulva, which was noted in six of the sixty cases reported in the literature, so that the coincidence is certainly not accidental. In one case a cure was obtained without operation by treatment with ointments and sitz baths and forcible dilatation of the narrow introitus under anaesthesia. A similar result was effected by Haller by cauterization with formalin, painting the vulva thrice daily with 50 per cent. ichthyol, and the use of compresses wrung out of hot water.

Herpes in Women.—LEWIN (*Deutsch med. Wochenschrift*, 1900, Nos. 17 and 18) observed 112 cases of herpes in 1584 gynecological patients, 83 being cases of herpes genitalis. In 23 the eruption occurred during menstrua-

tion, in 37 at the beginning of the flow, and in 49 after its cessation. In 17 patients it recurred regularly at the menstrual periods only. No close relation could be established between the development of herpes and pregnancy or the climacteric.

The writer's conclusions are opposed to those of Unna, that herpes genitalis is peculiar to prostitutes. He was unable to trace any connection between the eruption and disturbances of menstruation.

Hydrotherapy in the Treatment of Climacteric Disturbances.—GOTT-SCHALK (*Deutsch med. Wochenschrift*, 1900, No. 23), having been disappointed in the results obtained by the use of ovarian extract, has tried warm salt baths, with great benefit to his patients. After daily baths for four weeks he has noted marked relief of the flushing and sweats so common in women at the climacteric. He is opposed to Glaeveke's view that these disturbances are entirely independent of extirpation of the uterus. In his opinion the main factor is increased arterial pressure due to irritation of the vasomotor nerves. The hot flushes are preceded by a sensation of chilliness due to contraction of the surface capillaries, while the sweating results from dilatation of the vessels. The hot baths cause lowering of the arterial pressure by dilating the capillaries.

Torsion of Ovarian Tumors.—MANN (*Magyar Orvosi Archivum; Centralblatt für Gynäkologie*, 1900, No. 48) reports twenty-four cases of torsion. His own percentage of cases (28.9 per cent.) is high as compared with those of many writers, although the variation between Spencer Wells' statistics (2.4 per cent.) and Küstner's (38.8 per cent.) is great.

As direct causes of torsion he notes extreme mobility of the tumor, long, slender pedicle, ascites, and relaxation of the abdominal walls. As indirect causes he mentions violent exertion, sudden changes of posture, pregnancy and parturition, and the presence of a double cyst.

The writer agrees in the main with Thornton, accepting only one of Küstner's theories, viz., that tumors springing from the left ovary, but situated in the right side of the pelvis, are twisted from right to left, and the reverse with regard to left-sided growths.

Retroflexion without Symptoms.—E. SCHROEDER (*Centralblatt für Gynäkologie*, 1900, No. 49), from an examination of 411 gynecological patients, found retroflexion of the uterus in 25 per cent. without resulting local symptoms. He infers that persistent retrodisplacement is not necessarily a pathological condition.

Among the symptoms referable to this malposition menorrhagia is usually the initial one. In general the disturbances are due not to the displacement, but to complications.

Ultimate Results of Operation for Retrodisplacement.—COHN (*Centralblatt für Gynäkologie*, 1900, No. 49) in reviewing the statistics of the Breslau Clinic for five years found that 338 patients had been operated upon for retrodisplacement. Only 130 could be traced—39 cases of shortening of the round ligament, 65 of ventrofixation, and 26 of vaginal fixation.

In 91 per cent. a permanent cure was made at periods varying from one to five and a half years. Vaginofixation was limited to cases in which the patient had passed the climacteric. Shortening of the round ligaments was employed in cases of movable and ventrofixation in those of adherent retroversion.

Injury to the Ureter During Ovariectomy.—**PHAENOMENOW** (*Centralblatt für Gynäkologie*, 1901, No. 1) reports a case in which a piece of the right ureter was excised during the enucleation of an intraligamentary cystoma. It was impossible to perform uretero-urethral or uretero-vesical anastomosis, and the operator did not wish to suture the ureter in the rectum or abdominal wound. He accordingly ligated the upper end in two places. The patient made a smooth recovery, and seven months later had no urinary symptoms, so that it was inferred that the right kidney had undergone atrophy, as occurs in experiments on animals. The writer does not recommend this method of dealing with the injured ureter except in cases in which anastomosis is impracticable (?).

Entero-vaginal Fistula Following Vaginal Section.—**CONDAMIN** and **VORON** (*Arch. Prov. de Chir.; Centralblatt für Gynäkologie*, 1901, No. 1) analyze thirty cases of fistula, thirty involving the large intestine, five the small, and one the caput coli. The fistula may develop soon after operation in consequence of injury from instruments or during the separation of adhesions, or, later, due to sloughing of a raw surface on the gut, or injury to the mesentery. Less often the intestine may be directly cut or clamped while opening the cul-de-sac.

The presence of the fistula is indicated by the escape of feces into the vagina, its location being inferred by the character and amount of the discharge. Spontaneous healing is the rule, which may be hastened by cauterization of the edge of the fistula. It may be closed by lateral vaginal flaps according to Doyen's method, if accessible, otherwise it is necessary to perform celiotomy. The operator in the latter case is aided by an assistant pushing up the fistulous tract with his finger per vaginam. After separating the gut and closing the fistula with Czerny-Lambert sutures a gauze drain is carried down through the vaginal opening.

Bacteria in the Urine.—**PREDÖHL** (*Centralblatt für Gynäkologie*, 1901, No. 2) reports seven cases in which he found the bacterium coli in the urine. He believes that the micro-organisms were in the blood, and entered the bladder secondarily. In consequence of some local irritation (cold, overdistention of the bladder, etc.) cystitis may arise, which often subsides without treatment. Salol is the best drug for internal medication.

Radical Operation for Carcinoma Uteri.—**WERTHEIM** (*Centralblatt für Gynäkologie*, 1901, No. 2) reports twenty-nine cases of abdominal hysterectomy for cancer of the uterus, in eleven of which there was glandular infiltration. Many of these affected glands were only recognized at the time of operation, the parametric tissues being healthy. The writer shows clearly that it is impossible to determine positively the condition of the glands and

broad ligaments until they have been examined microscopically, hence the rule to perform a radical operation in every case.

The mortality was high (nearly 40 per cent.), but with improved technique the time of operation was shortened from two or three to one and one-half hours. Especial difficulty was experienced in dissecting out glands adherent to the large veins. The ureters were first identified and drawn aside, when the uterine arteries were ligated near their origin. It was found that hemorrhage was not always controlled by provisional double ligation of the internal iliac arteries.

The writer raises the question whether in complicated cases it may not be preferable to implant the ureters in the bladder as a preliminary step. He believes that an important point in the technique is the final separation of the vagina and removal of the entire diseased mass from below (after suturing the peritoneal flaps over the detached uterus and closing the abdomen), thus avoiding all risk of sepsis.

Sufficient evidence has not been accumulated to allow of positive statements with regard to the ultimate results of this radical procedure. In view of its serious nature, the general condition of the patient must be carefully considered before attempting it.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES'.

UNDER THE CHARGE OF
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Bullous Enlargement of the Middle Turbinate Bone (Concha Bullosa).
—DR. J. PAYSON CLARK, of Boston, Mass., reports (*New York Medical Journal*, October 20, 1900) two cases, the morbid growth in one of which is illustrated by three wood-cuts, and he mentions two others upon which he had operated. He presents in continuation a summary of the subject with valuable bibliographic references.

[This affection seems to occur only in adults and principally in females. It is characterized by headache as a chief symptom, with gradual progressive sense of obstruction in the nose, sometimes interfering with free respiration. On examination the middle turbinate is found expanded into a smooth tumor of irregular contour which is composed principally of an enlarged ethmoidal cell or a series of cells. The only treatment is excision of the distended mass, and this is usually best done with the cold wire snare.—ED.]

Surgery of the Maxillary Sinus in the Eighteenth Century.—DR. J. BARATOUX, of Paris, communicates an interesting article (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, February, 1901) detailing

the various procedures employed in the eighteenth century (from 1718) for suppurative diseases of the maxillary sinus, since which time he claims that surgery of the maxillary sinus has remained stationary until the present day, except, perhaps, for the procedure of Dr. George Caldwell, who, in 1893, devised a method for draining the sinus through the nasal passages after curetting the morbid products through a temporary opening in the canine fossa.

Recurrent Tumor of the Tonsil.—*The New York Medical Journal*, October 27, 1900, contains a paper by R. P. LINCOLN, of New York, entitled "A Supplementary Report on a Recurrent Tonsillar Tumor," illustrated both macroscopically and microscopically. Nevertheless the diagnosis, as in the case of the original growth, remains obscure despite the careful examination of a number of histologists. The diagnosis lies between sarcoma, chronic hyperplasia, and syphilis, with strong leaning to the diagnosis of hyperplasia.

Adhesion of the Soft Palate to the Posterior Wall of the Pharynx Relieved by Operation.—DR. AUGUSTUS KOENIG, of Philadelphia, reports (*Philadelphia Medical Journal*, February 16, 1901) a successful operation in a Scotch machinist, aged thirty-four years, who, when eleven years old, had an ulcerated sore throat lasting eight months, in the healing of which adhesion took place between the soft palate and the posterior wall of the pharynx, completely closing the posterior nares. The communication between the nose and the mouth was scarcely enough to admit a retractor, and nasal breathing was almost completely abolished.

Under cocaineization with a 5 per cent. solution, separation of the soft palate was begun with a curved pair of scissors and completed with a eurette of Gottstein curve with a double lateral cutting edge. A gauze plug was employed for forty-eight hours, when it was replaced by a hollow silver plug especially made to fit the cavity, enabling the patient to breathe perfectly and preventing the freshly cut surfaces from reuniting. Healing took place in three weeks, and there has been no return of the trouble during the twenty months which have elapsed since the operation.

Complete Stenosis of the Larynx in Sequence of Intubation; Surgical Restoration of the Canal.—L. DE PONTIÈRE, assistant to the Oto-Laryngological Clinie at the University of Louvain, reports (*Annales des Mal. de L'Oreille, du Larynx, etc.*, 1900, No. 11) a case of complete stenosis of the larynx which came under the care of Prof. Debaisieux at the Hospital Saint-Pierre four years after the intubation. A child, aged two years, with serious laryngeal diphtheria, was intubated as a matter of prophylaxis and returned cured to his family eight days later with the tube removed. Progressive dyspnoea ensued in sequence of cicatrization, and tracheotomy became necessary which answered perfectly, although it had never been practicable to remove the canula on account of impending asphyxia. During these four years the patient had been chloroformed thirty-six times and submitted to as many operations without success. Laryngoscopic examination showed the larynx of small size, filled with cicatricial tissue covered

with mucous membrane. Thyrotomy was performed, the cicatricial tissue removed, and what is known as the chimney canula introduced; after which, little by little, an artificial passage was formed through which the patient was able to speak, although it still remained impossible to do without an ordinary canula.

It is presumed that the treatment would require several years before any prospect of permanently removing the canula. The case seems to be unique in literature.

A Suture of a Severed Trachea with Union by First Intention.—Dr. E. S. GOODHUE, of Honolulu, H. I., reports (*Philadelphia Medical Journal*, January, 1901) the case which occurred in a Japanese laborer, aged thirty-nine years, who had endeavored to commit suicide and had completely severed the trachea between the second and third cartilages, so that the retracted portions were an inch or more apart. These were brought together with a chromicized suture of catgut, which included the inner and outer covering of the tube, and then the cartilages were tied together with three stitches, so that the approximated edges might be held as closely as possible. The external wound was closed with silk stitches upon a small drainage-tube, and the patient was sent to a hospital, where he did well, the wound healing in three weeks, all functions being carried on as usual.

Thirty-two days after the operation the patient ripped open the external wound, and Dr. Goodhue was able to look upon his reunited trachea, which appeared to be as good as ever, with the stitches fast disappearing. Some months later the patient was executed for murder, which he had committed just before his first attempt at suicide.

[In view of the difficulty encountered in holding together the retracted portions of a severed trachea, this method of procedure is both satisfactory and encouraging.—ED.]

Continuous Sternutation of Seven Months' Duration Suddenly Relieved by the Application of an Apparatus for Straightening the Spine.—Dr. MASSÉ, of La Rochelle, reports (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, February 2, 1901) this case. It occurred in a neurotic girl, aged eighteen years, who had occasionally complained of deranged digestion, often accompanied by headaches and facial neuralgia. In October, 1899, she was attacked with influenza, principally of a gastric type. This was followed by a dry cough, which ceased suddenly on December 15th, and was replaced by paroxysms of sneezing, which commenced at awakening and did not terminate until the moment of sleep. The paroxysms were repeated seven or eight times a minute, sometimes oftener, especially after eating. They were preceded by irritation in the nose, but were not followed by any serious discharge. Atmospheric conditions had no effect upon them. After a varied and prolonged course of ineffectual treatment it was noticed that the spinal column was bent forward, and that this gradually became more and more pronounced. Finally, an attempt was made to relieve this condition by an orthopedic apparatus, and upon the adjustment of the corset the paroxysms ceased abruptly and had not returned up to the date of the report.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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AND

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Pathogenic Organisms in Milk.—Finding enormous numbers of streptococci in a specimen of milk which had presumably been the cause of sickness in an infant, DR. D. H. BERGEY (*American Medicine*, April 20, 1901, p. 122) was led to examine specimens from other first-class dairies and obtained the same results in each case. These facts suggested questions as to the extent to which streptococci are present in the milk of healthy cows, whether they are more prevalent in that of herds kept under bad sanitary conditions, and as to their significance. Examination of a number of specimens gave positive results in some and negative in others. The organisms were found somewhat more frequently in the milk of cows kept under unsanitary conditions, but the differences were not very marked. Of 40 samples of market milk, 36 (90 per cent.) yielded micrococci, and 20 (50 per cent.) yielded streptococci. Of 16 samples of mixed milk from one of the best dairies, only 1 yielded streptococci. Of 28 from another, 5 gave micrococci, but no streptococci. Fifteen samples from two other first-class dairies yielded streptococci in only two instances, but 11 contained micrococci. Eight samples from individual cows of first-class dairies, injected into the peritoneal cavities of guinea-pigs, caused death in three cases, and in each of these *Staphylococcus pyogenes aureus* was isolated from the organs. No streptococci were found. As to the significance of the presence of streptococci in the milk of healthy cows, nothing definite can be stated, but, judging from the results of experiments by Beek, Dr. Bergey believes it most probable that these organisms are not infrequently the cause of serious gastro-intestinal disorders in infants, and that this source of infection should always be taken into consideration when the cause of the sickness is not at once apparent. He advises that dairy owners should be cautioned regarding the danger arising from the hands of milkers having even slight lesions, since the entrance of such bacteria will, under favoring conditions of temperature, be followed by enormous multiplication.

During the first months of 1900, DR. E. KLEIN (*Journal of Hygiene*, January, 1901, vol. i., No. 1, p. 78) examined 100 samples of milk, taken in sterilized bottles from vessels directly from the country, primarily to determine whether or not any contained the bacillus of tuberculosis. This organism was found in 7 specimens, but in the course of the investigation other pathogens were detected, as follows: *B. pseudotuberculosis* in 8; *B. diphtheriae* in 1, and a pathogenic torula, which produced a fatal disease of a chronic nature, in another. From the secretions of certain diseased udders

he isolated 2 pyogenic bacteria—*B. diphtheroides* and *Streptococcus radiatus* (*pyogenes*).

Under orders from the Minister of Agriculture to the Hygienic Institute of the Berlin Veterinary College, the head thereof, OSTERTAG (*Zeitschrift für Fleisch und Milchhygiene*, ix., pp. 168 and 221) undertook an investigation of the virulence and specific bacterial content of milk of cows which, though reacting to tuberculin, show no clinical evidence of tuberculosis. Separate samples and the mixed milk of 50 cows were tested by bacteriological examination, intraperitoneal inoculation of cream sediment, and feeding experiments with guinea-pigs, of which animals, during the inquiry, no less than 526 were used. Individual samples from 49 cows which simply reacted to tuberculin yielded no bacilli. From his results Ostertag concludes that the mixed milk of larger herds which react without clinical evidence of the disease may by chance contain bacilli without being able, to any noteworthy extent, to produce tuberculosis by ingestion; and, further, that the milk of cows which give no clinical evidence may be considered as quite harmless. But with the milk of those with affected udders and of those which have become emaciated, the case is quite different. In no secretions of tuberculous cows are the bacilli so numerous as in that of the tuberculous udder. The most important measure for the prevention of dissemination of tuberculosis through the agency of milk is the weeding out of all cows with involved udders and of those which show emaciation, and this should be done by fortnightly veterinary examination. DR. LYDIA RABINOWITSCH (*Deutsch medicinische Wochenschrift*, 1900, No. 26, p. 416) reports absolutely negative results of examinations of mixed milk of large herds tested with tuberculin, while that of other herds which were under clinical supervision yielded, in a number of instances, virulent tubercle bacilli, which result emphasizes the great sanitary value of the tuberculin test.

Studies in Relation to Malaria.—DRS. G. H. F. NUTTALL, CORBETT, and T. STRANGEWAYS PIGG (*Journal of Hygiene*, January, 1901, p. 4) have made an extensive search for *Anopheles* in various parts of England, during which they collected specimens from no less than 173 localities, in many of which malaria has never existed at any time. Three species are found, the most prevalent being, as elsewhere, *A. maculipennis*. All three (*A. maculipennis*, *A. bifurcatus*, and *A. nigripes*) are to be found in all districts which were formerly malarious, as well as in others with no history of the disease. The investigations lead the authors to the conclusion that “the coincidence of the geographical distribution of ague and *Anopheles* as claimed by Grassi for Italy, and as probably holding good for other parts of the world, is hereby disproved for England, and consequently the generalizations are proved to be premature whereby he excludes other blood-sucking insects from being possible hosts of malarial parasites on the strength of this geographical agreement.” Also, “the disappearance of ague from Great Britain does not depend upon the extinction of mosquitoes capable of harboring the parasites of malaria.” Since the geographical distribution of *Anopheles* in England is wider than the former prevalence of malaria there, they conclude that numerical distribution of the insects is of greater importance than the geographical. The occasional occurrence of ague in out-of-the-way places

can, they believe, be explained by the existence of *Anopheles* in non-malarious districts without assuming the importation of infected mosquitoes from abroad, for the local insects may become infected by biting a malarious subject coming from other parts and then may infect healthy persons. The disappearance in England of ague depending not upon the extinction of *Anopheles*, is probably due to several causes operating together, namely, reduction in the number of the insects due to drainage of the land; reduction of the population of infected districts owing to emigration, thus reducing the number of infected persons who could infect the *Anopheles*; and the reduction of the chances of infecting the *Anopheles* through chocking, by the use of quinine, the development of the parasites in the blood of infected subjects.

Canned Meats.—From a series of experimental observations on the canning of meats, Drs. BISCHOFF and WINTGEN (*Zeitschrift für Hygiene und Infektionskrankheiten*, xxxiv., p. 496) conclude that penetration of heat into the interior of the meat is uneven and not wholly dependent upon the size of the pieces. The condition of the meat, whether fatty or not, whether compact or fissured, is of much importance, as is also the amount of liquid in the can. The fissures are in part caused by the cooking, which converts the connective tissue to gelatin and brings about a contraction of the muscle substance. Evenness of quality, depending upon the age of the animal, the shape of the piece, and amounts of fat and connective tissue, is not easily controlled. In consequence of the high temperature necessary for complete sterilization, the meat becomes more or less stringy, according to the nature of the piece. Absolute sterility is obtained at different temperatures under varying conditions. The best results are obtained with cans containing 600 and 200 grammes by heating at 120.5° C. for seventy and fifty minutes respectively, the meat being tender, though somewhat stringy, and absolutely sterile.

Canned meats are not the equals of fresh meats as used in the household, but are to be preferred for use by troops in the field to that of freshly killed animals, consumed without undergoing any process of ripening. Moreover, they possess the advantage of easy transportation and quick preparation for use as needed.

Alcohol and Susceptibility to Infection.—The results of an extensive series of experiments on the influence of alcohol on susceptibility to infection, conducted by Dr. TAAV. LAITINEN (*Zeitschrift für Hygiene und Infektionskrankheiten*, xxxiv., p. 206) lead to the conclusion that under all conditions alcohol causes a distinctly increased susceptibility to experimental infection, whether it is given before or after or both before and after the introduction of the infective material, and whether it is given in a few large doses or in numerous small doses over a longer time, and whether with acute or chronic infections or pure intoxication. The animals (dogs, rabbits, guinea-pigs, fowl, and pigeons) employed received the diluted alcohol either by the mouth or injected under the skin.

The favoring influence of alcohol on the different morbid processes showed itself in the fact that the affection terminated fatally in the alcoholized animals, the controls being unharmed, or that at least the fatal result was appreciably hastened when both succumbed. With rabbits inoculated with

anthrax bacilli of diminished virulence, the former was the case; with guinea-pigs treated with diphtheria toxin, the latter was observed.

Alcohol was administered to a number of pregnant guinea-pigs for some days. Some aborted toward the completion of term; others gave birth to living young. The majority of the latter died before the tenth day, but those from mothers which had received but small doses remained alive longer. The survivors when experimented upon with diphtheria toxin showed a distinctly increased susceptibility in comparison with animals of equal age, the offspring of non-alcoholized mothers.

Observations of temperature showed no differences when the alcoholized animals had not been infected, excepting when such large amounts were given that the animal was almost in convulsions, when a decided fall was observed. After infection the alcoholized animals showed elevated temperature appreciably longer than the controls (averages, twenty-seven and twenty-four days respectively). The results of the research as a whole hardly justify the employment of alcohol in the treatment of infectious diseases in man.

Disinfection of Tuberculous Sputum.—According to DR. DONATO OTTOLENGHI (*Zeitschrift für Hygiene und Infektionskrankheiten*, xxxiv., p. 259) corrosive sublimate 5 : 1000, 7.5 : 1000, or 8 : 1000, with or without the addition of hydrochloric acid or salt, will disinfect dried tuberculous sputum with certainty when sprayed upon it, as will also a 10 per cent. lysol solution, but a 10 per cent. milk of lime is without effect. Formalin in 10 per cent. strength and chloride of lime in the same strength in powder form are ineffective against dried sputum. Chloride of lime in solution, however, appears to diminish somewhat the virulence.

Lysol, though equally effective with corrosive sublimate, is not equally available, on account of its much higher cost. Corrosive sublimate must be employed at least as strong as 5 : 1000, and the spraying must be carried out with a generous hand. When a room containing dried sputum is disinfected in this way, it should be tightly closed for some time after being sprayed, and all draughts prevented in order to prevent rapid drying of the sprayed surfaces.

The lessened efficiency of aqueous sublimate solutions with lapse of time and exposure to light can be prevented by the addition of a moderate amount of salt or of hydrochloric acid—not more than two molecules of salt to each of sublimate; thus, 2.16 grammes of salt to a 5 per mille solution.

In recommending sublimate as a room disinfectant, the matter of possible injury must be considered. Danger to future occupants has been repeatedly pointed out, and mercury has been detected in the urine of persons who have occupied for some months rooms that had undergone sublimate disinfection.

Plague and Rats.—A report on the epidemic of plague in Kobe and Osaka by Dr. Kitasato and others, abstracted by Dr. M. J. ROSENAT (*Public Health Reports*, April 5, 1901), states that in two and one-half months the authorities of Kobe paid for 20,000 and of Osaka for 15,000 rats brought in dead or alive. Many more were found dead and disposed of without any claim for the official reward of 5 sen (about 2.5 cents) per head, because of the fear of compulsory disinfection that followed the finding of the dead animal. About a fifth of those found dead in Kobe and a tenth in Osaka were infected with *B. pestis*.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Punctiform Calcareous Bodies (so-called Calcified Glomeruli) of the Kidney Cortex.—BAUM (*Virchow's Archiv*, 1900, clxii., 85) has recently re-investigated, under the direction of Orth, the deposit of lime in the kidney.

Macroscopically the lime appears as small white lines and dots. Authorities generally agree that the lines are to be referred to its deposit in the tubules and in the interstitial tissue. Its situation, however, when it appears as points or dots has been a matter of dispute. Some have claimed that it was in the glomeruli, others that it was in the capsular space. Orth has recently expressed the opinion that it was deposited chiefly in the colloid contents of dilated tubules.

The writer investigated some twenty kidneys in which yellowish-white specks were more or less numerous in the cortex. Serial sections showed on microscopical examination two kinds of cysts present, although there was no evidence of chronic interstitial changes. The larger cysts were generally irregularly shaped, and their walls were lined in places with tall epithelium. The contents of the cysts were colloid. They were found both in the cortex and occasionally in the pyramids. The other cysts were round, about the size of a glomerulus, and confined to the cortex. The lining epithelium when present was low in type like that covering the capsular space of a glomerulus. Occasionally one or two loops suggesting a portion of a glomerulus projected from the wall. Evidently these cysts represent capsular spaces in which the glomeruli had not developed, and were to be regarded as congenital in origin.

It was found that the lime was deposited chiefly within these cysts in the colloid material filling them. It occurred as small granules and as concentrically layered masses. When fused together these masses formed a spherical ball. Only occasionally was calcification found to have taken place in a sclerosed glomerulus.

The Histology of Chronic Fibrous Pneumonia.—VOGEL (*Ziegler's Beiträge*, 1900, vol. xxviii., p. 179), working in Marchand's laboratory, studied ten cases of indurative pneumonia. Eight of the cases showed the organization of a pre-existing fibrinous intra-alveolar exudate. The two other cases showed a bronchial or a peribronchial inflammatory process which led to cellular infiltration and hyperplasia of the connective tissue of the lung. The end result of both processes is the same, namely, the replacement of the lung parenchyma by a more or less compact mass of connective tissue. In the first group of cases the newly formed connective tissue plugs contained in the alveoli enlarge and finally unite with the alveolar walls. In the second group the alveolar walls thicken and obliterate the alveoli.

The origin and development of the intra-alveolar connective tissue was investigated. When in acute pneumonia resolution does not occur the plugs of fibrin become retracted from the alveolar walls and clear spaces are formed in the periphery of the alveoli. In the first stage of the organization of the exudate, spindle-cells are found on the surface and advancing into the interior of the fibrinous plugs, and spindle cells are also seen extending along the threads of fibrin which pass through Cohn's pores. Gradually, connective tissue replaces the fibrinous masses. The connective tissue fibrillæ form a loose network at first, which contains in its meshes many plasma cells. Later the connective tissue becomes more compact. The bands which pass through Cohn's pores and the strands which unite the plugs to the alveolar wall become thicker until wall and contents become blended into one mass of fibrous tissue. In one case the new connective tissue contained delicate young elastic fibres.

Cohn thinks that the connective tissue arises from the interlobular and subpleural tissue, because he found the most numerous and the most developed connective tissue plugs in the neighboring alveoli. Ribbert maintains that the connective tissue begins to form in the smallest bronchi and bronchioles, and grows peripherally into the alveoli. Vogel opposes both these views. His observations lead him to believe, with von Kahliden and Borrmann, that the organization takes place from the alveolar wall. Not all the fine threads which suspend the connective tissue plugs in the centre of the alveoli pass to other plugs through the pores in the alveolar wall. Some are united to the wall; these he regards as primary outgrowths from the wall. Their delicate structure and the fact that they are found in the first stage of organization favor this view.

Vogel concludes that organization proceeds (1) from the alveolar wall into the fibrinous plugs; (2) from one fibrinous plug to another by the growth of connective tissue through Cohn's pores.—J. H. P.

Histological Changes Produced by Freezing.—RISCHPLER (*Ziegler's Beiträge*, 1900, vol. xxviii., p. 541) reports at considerable length the changes produced in animal tissues by freezing with ether spray. In his experiments he utilized the ear and the thigh of the rabbit and the tail of the mouse, keeping each part in a frozen condition for three minutes. Thirteen animals were used in each series and the tissues examined histologically at periods from twenty minutes to eight days after the freezing.

Rischpler found that all tissues examined (epidermis, muscle, fibrous tissue, tendon, cartilage, bone, nerves, and bloodvessels), with the exception of elastic fibres, show changes under the influence of a lower temperature. The extent of the change depends on the degree of cooling and the resistance of the tissue, the latter varying with size, structure, position, and nutrition. The mildest form of change is the appearance of vacuoles and fine granules in the protoplasm. The next grade is characterized by a shrinkage of cell and nucleus, the latter assuming bizarre shapes. Then comes loss of staining reaction in the protoplasm, and finally the destruction of the nucleus and disintegration of the cell.

These changes are an expression of cell death, and in those places where they are very frequent lead later to tissue necrosis. They are caused by the

direct action of the cold on the tissue, and have no relation to thrombosed bloodvessels occasionally met, but the thrombi are due to these same changes affecting the bloodvessels. The injury is produced by the cold acting to abstract water from the water-containing components of the cell, and this water is converted into ice either within or without the cell. If this happens within the cell we find after thawing that the cell is made up of concentrated water—poor protoplasm, and of drops of water (in a stained section such a cell appears as a vacuolated cell); if without the cell, the cell and nucleus are found to be shrunk and distorted, while intercellular structures—*e. g.*, protoplasmic bridges of the epidermis—are destroyed or distorted. Beside necrosis inflammatory changes follow as a result of the tissue injury.

Exudation with fibrin formation appears in twenty minutes, and peripheral position of the leucocytes in bloodvessels and their emigration are noted in three-fourths of an hour after freezing. The cells slightly affected regain their normal appearance; those more seriously altered die and are replaced by regeneration from intact cells. The first signs of regeneration appear after six hours in the epidermis in the form of cells with large, constricted nuclei and multinuclear cells. These giant-cells are found also in the endothelium of arteries after twenty-four hours and in cartilage after three days. They are formed most probably by amitosis. After twenty-four hours mitotic figures are found in nearly all of the tissues. In muscle, regeneration begins in twenty-four hours, and many mitoses are found after three days. Regeneration progresses rapidly.—H. A. C.

The Presence of Fat in Pathological Tissues.—SATA (*Ziegler's Beiträge*, 1900, vol. xxviii., p. 461) gives the results of the examination of a number of pathological specimens with respect to the presence of fat. He finds that Sudan III. gives better results than the other fat-staining reagents. He fixes his tissues in formol and cuts sections with freezing microtome. The sections are dehydrated quickly in alcohol, stained with several changes of a saturated solution of Sudan III. in 95 per cent. alcohol, and mounted in glycerin. Sata insists on the necessity of studying both thin and thick sections. In struma, in the new-formed cells of inflammatory proliferation, in myoma, and in other pathological lesions he commonly finds fat present. In foci of necrosis there is usually a zone of fat droplets about the necrotic tissue. Their presence in the necrotic material is unusual, and when found their arrangement speaks for a previous existence in living cells. The same facts hold true for tubercular caseation, and as here the fat is absent in the early stages he thinks fatty degeneration has no causal relation to caseation.

In tumors in which no necrosis has taken place he very frequently finds great numbers of fat droplets, both in tumor and bordering stroma cells. The presence of fat seems to bear no relation to the age and nutrition of the cell. Connective tissue that has undergone a hyaline degeneration stains diffusely with Sudan III. In sarcoma cells fat droplets are not very common.

Sata thinks that the facts made out hardly support the view that the fat in these processes always arises through injury to the cell life in the sense of a fatty degeneration. He suggests that possibly in those cases in which necrosis is present the proteid has become so greatly changed that it can be readily broken down by the bordering cells, with the formation of fat. How-

ever, he does not deny that the living cell may be directly changed by chemical substances present in neerobiosis.—H. A. C.

The Occurrence of Lycopodium Spores within a Cancer of the Skin.—DE-MESER (*Virchow's Archiv*, 1901, vol. elxiii., p. 111) examined a typical epidermoid eareinoma from the arm of an old man, and saw in the tumor peenliar three-cornered bodies which proved to be lycopodium spores. Inquiry showed that the man had been in the habit of dusting the malignant nleer with lycopodium powder.

The spores usually were found lying in the connective tissue stroma, either free in clefts between connective tissue cells or enclosed in the protoplasm of giant cells. Sometimes the bodies were lying among masses of epithelial cells, but were not within epithelial cells. At times the spores had penetrated one-third of the way through the tumor.

Hence De-Meser reviews the literature upon the power of absorption of granulating surfaces. This review showed that the power of absorption possessed by granulating surfaces varies with the condition of the granulating surface and with the material placed upon it. Under certain circumstances soluble substances (*c. g.*, alkaloids) or insoluble substances (cinnabar) or living organisms (bacteria) can be absorbed.

The lycopodium spores were too large to enter through the lymphatic spaces, and De-Meser believes that the spores were caught in the furrows of the granulating surface and then were overgrown by the cancer.

The case is important because numerous observers have found blastomyeetes in cancerous tissue and have believed that these bodies produced the epithelial growth. But since it is proved that lycopodium spores can enter cancerous tissue it is certain that blastomyeetes can enter in the same way, and may be present accidentally and have nothing to do with the causation of the disease. Moreover, a number of men have inoculated animals with blastomyeetes and produced nothing but grannlomata; moreover, blastomyeetes in cancers are few in number and have no regular relation to the cancerous process. Nor is the fact that blastomyeetes are seen in the protoplasm of malignant tumors any argument that they cause proliferation of the epithelial cells, for blastomyeetes have a limited power of motion, and in sarcomata the cells are of mesoblastic type, and hence may be phagocytic.—E. H. N.

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